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FIG. 1A

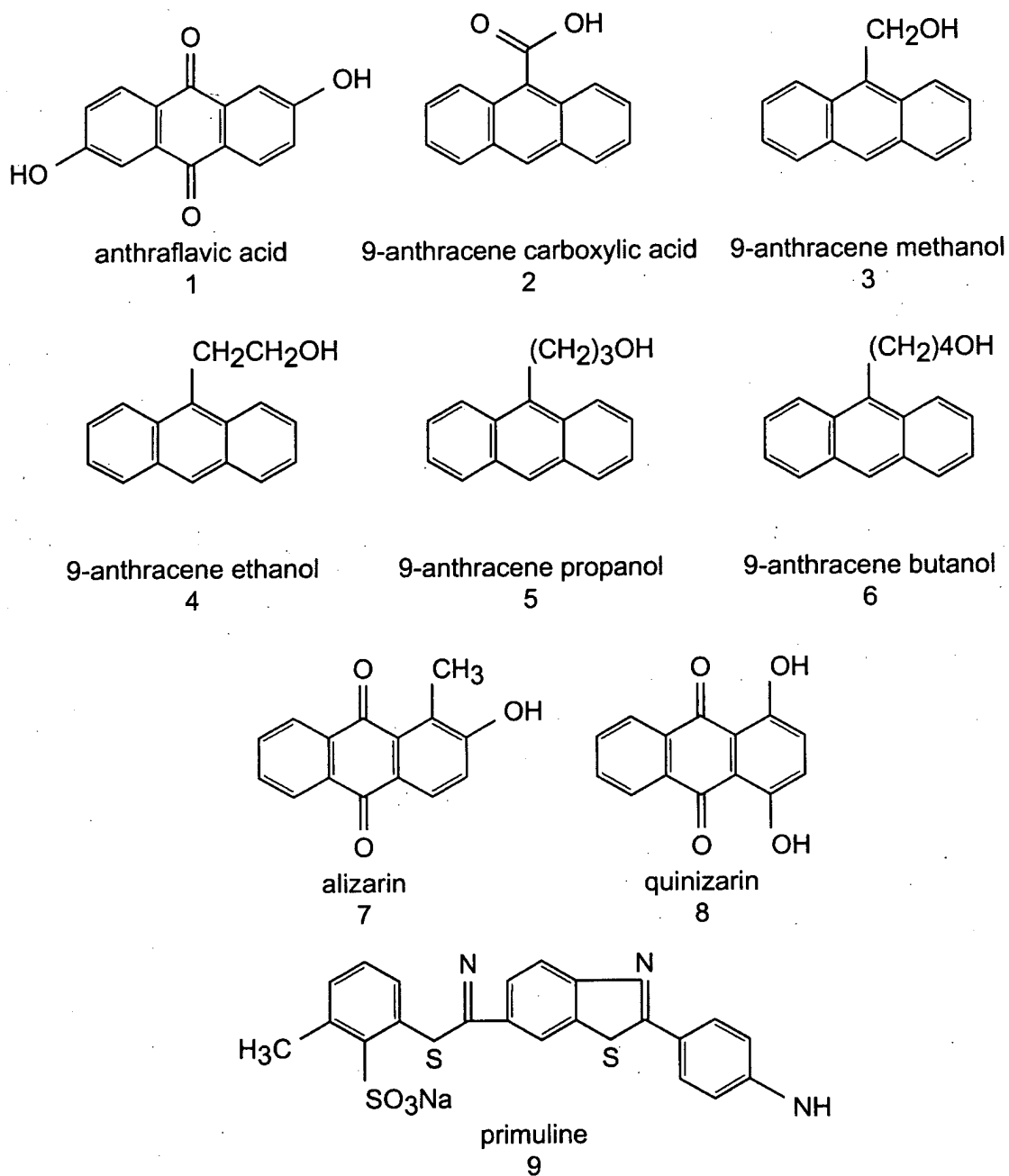


FIG. 1F

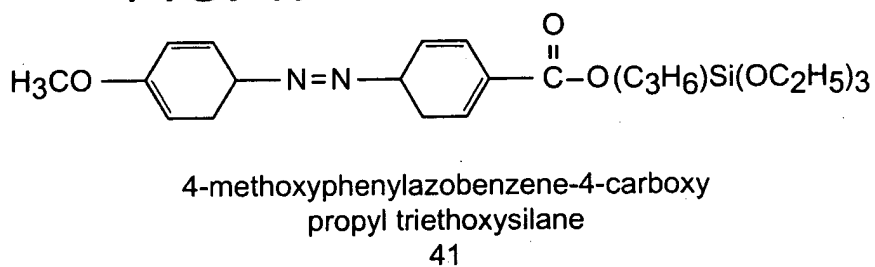
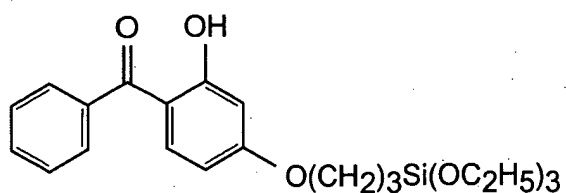
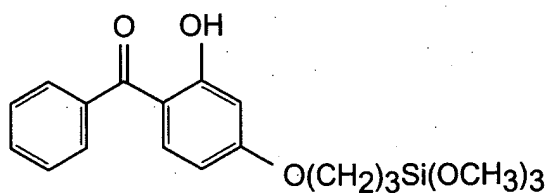


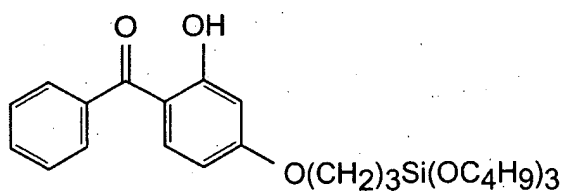
FIG. 1B



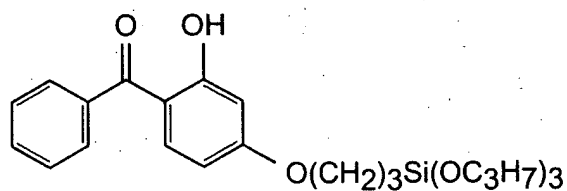
2-hydroxy-4-(3-triethoxysilylpropoxy)-
diphenylketone
10



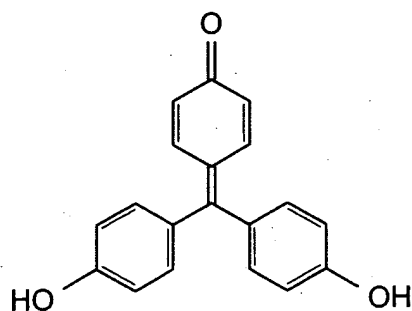
2-hydroxy-4-(3-trimethoxysilylpropoxy)-
diphenylketone
11



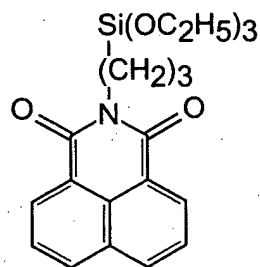
2-hydroxy-4-(3-tributoxysilylpropoxy)-
diphenylketone
12



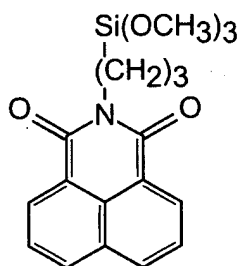
2-hydroxy-4-(3-tripropoxysilylpropoxy)-
diphenylketone
13



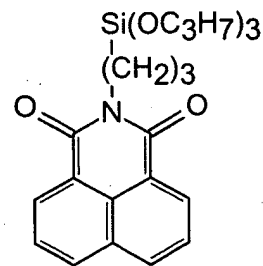
rosolic acid
14



triethoxysilylpropyl-1,8-naphthalimide
15

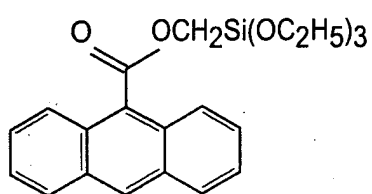


trimethoxysilylpropyl-1,8-naphthalimide
16

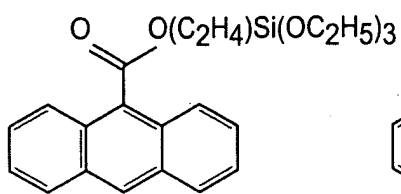


tripropoxysilylpropyl-1,8-naphthalimide
17

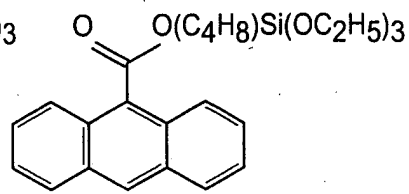
FIG. 1C



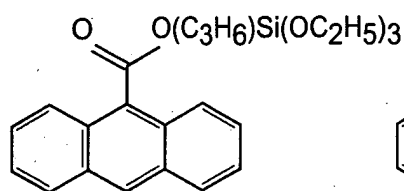
9-anthracene carboxy-methyl
triethoxysilane (TESAC)
18



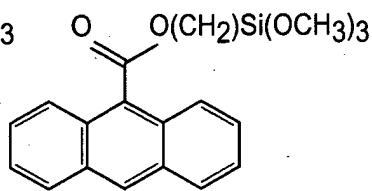
9-anthracene carboxy-ethyl
triethoxysilane
19



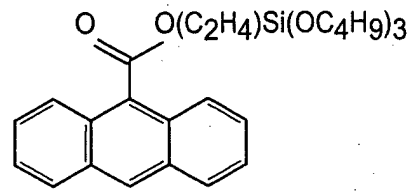
9-anthracene carboxy-butyl
triethoxysilane
20



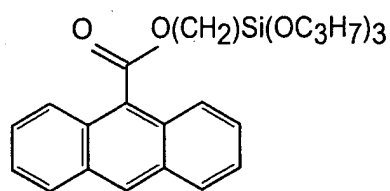
9-anthracene carboxy-propyl
triethoxysilane (TESAC)
21



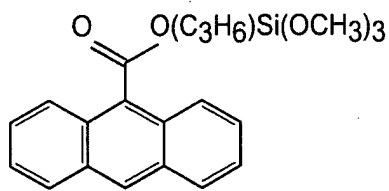
9-anthracene carboxy-methyl
trimethoxysilane
22



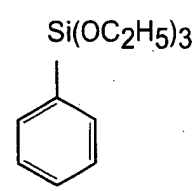
9-anthracene carboxy-ethyl
tributoxysilane
23



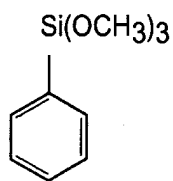
9-anthracene carboxy-methyl
tripropoxysilane
24



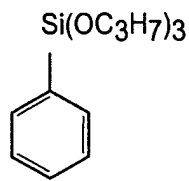
9-anthracene carboxy-methyl
trimethoxysilane
25



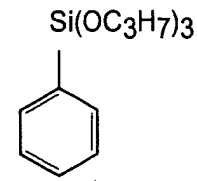
phenyltriethoxysilane
26



phenyltrimethoxysilane
27

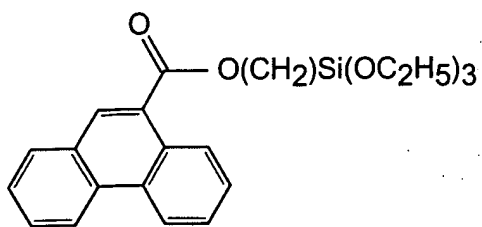


phenyltripropoxysilane
28

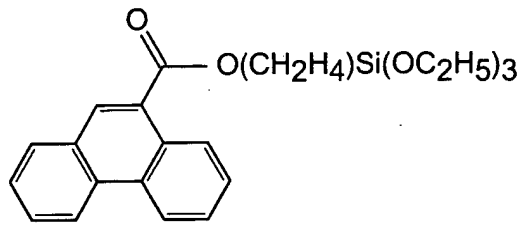


phenyltriethoxysilane
29

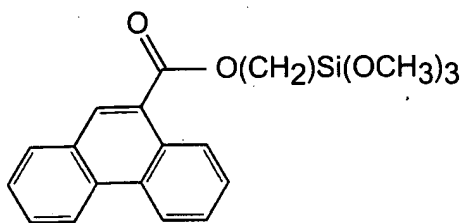
FIG. 1D



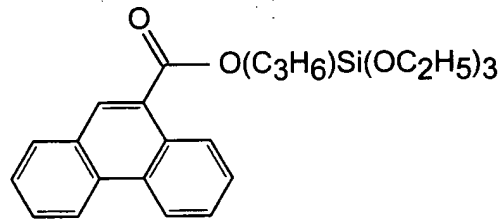
10-phenanthrene carboxy-methyl
triethoxysilane
29



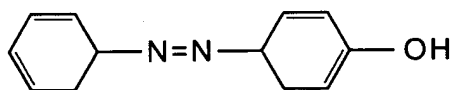
10-phenanthrene carboxy-ethyl
triethoxysilane
30



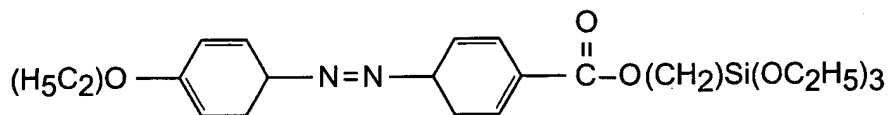
10-phenanthrene carboxy-methyl
trimethoxysilane
31



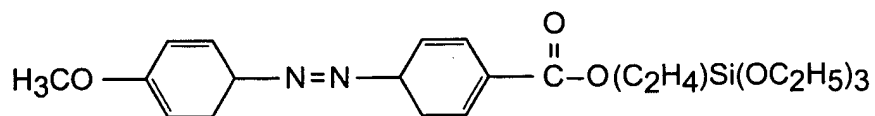
10-phenanthrene carboxy-propyl
triethoxysilane
32



4-phenylazophenol
33

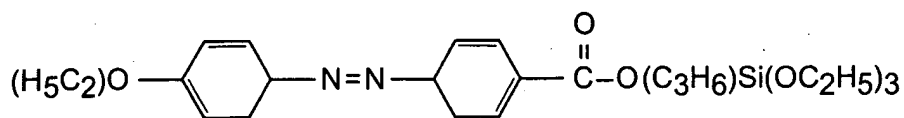


4-ethoxyphenylazobenzene-4-carboxy
methyl triethoxysilane
34

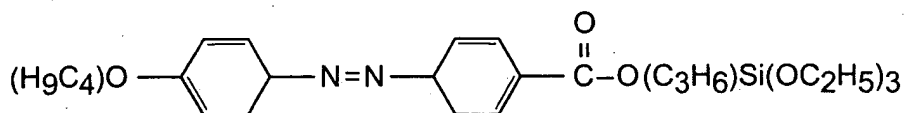


4-methoxyphenylazobenzene-4-carboxy
ethyl triethoxysilane
35

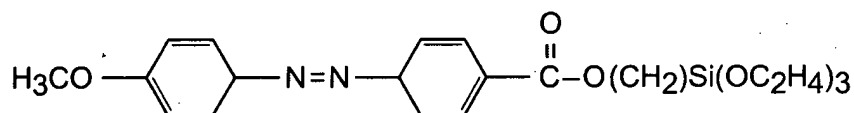
FIG. 1E



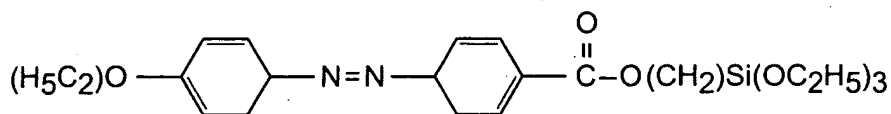
4-ethoxyphenylazobenzene-4-carboxy
propyl triethoxysilane
36



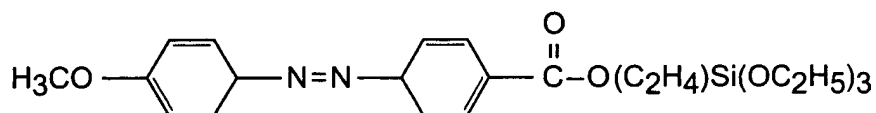
4butoxyphenylazobenzene-4-carboxy
propyl triethoxysilane
37



4-methoxyphenylazobenzene-4-carboxy
methyl triethoxysilane
38



4-ethoxyphenylazobenzene-4-carboxy
methyl triethoxysilane
39



4-methoxyphenylazobenzene-4-carboxy
ethyl triethoxysilane
40

TGA

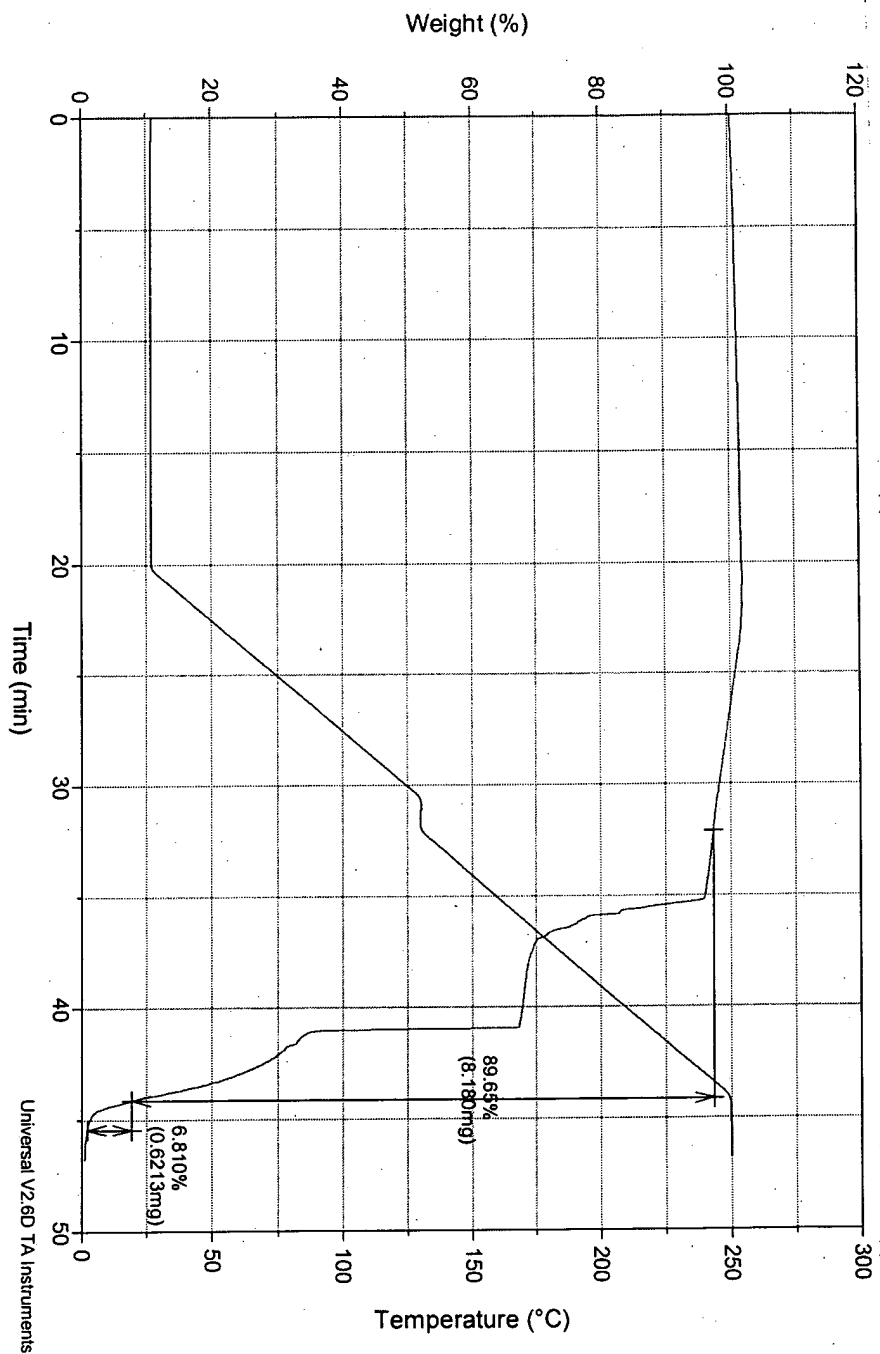


Figure 2

TGA

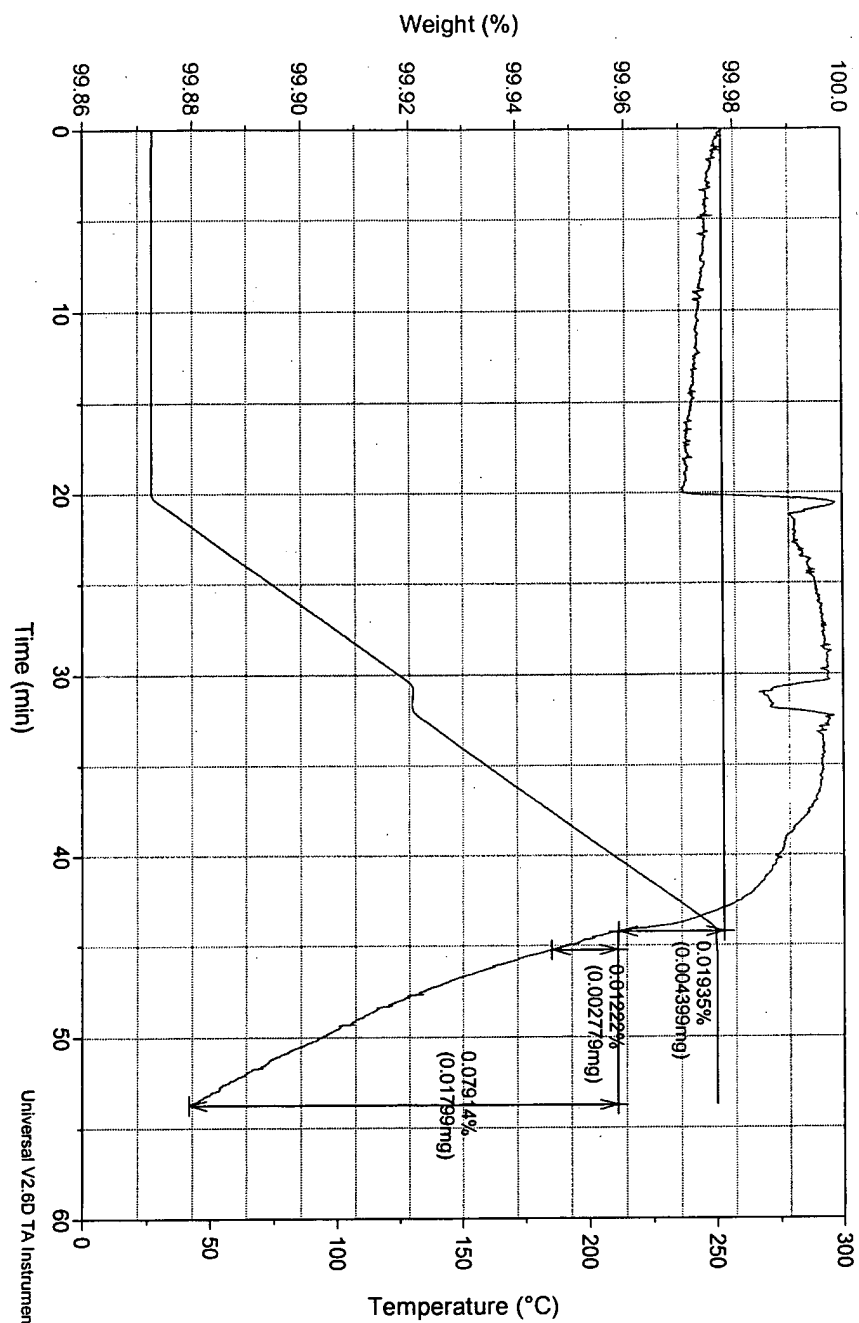


Figure 3

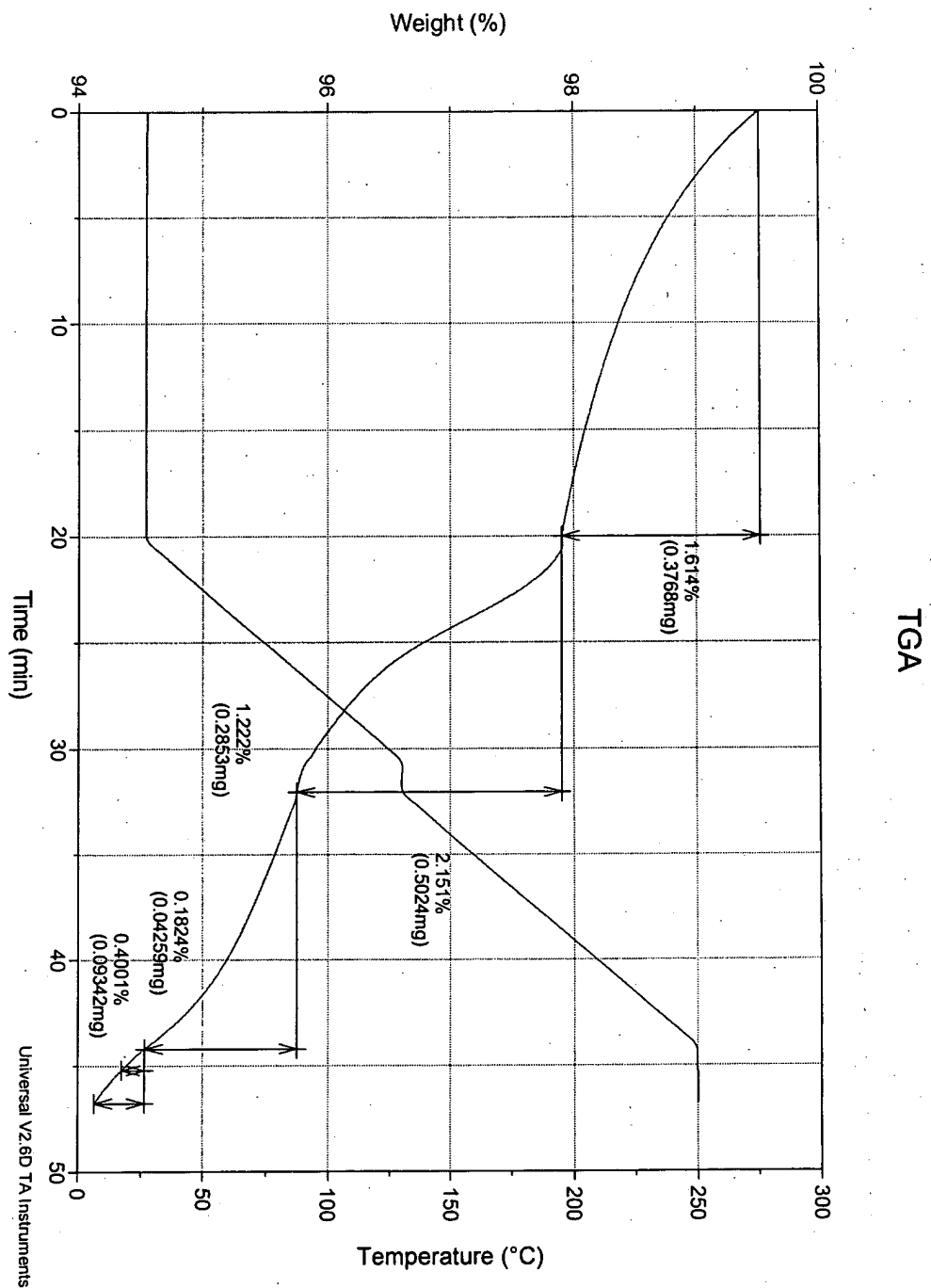


Figure 4

TGA

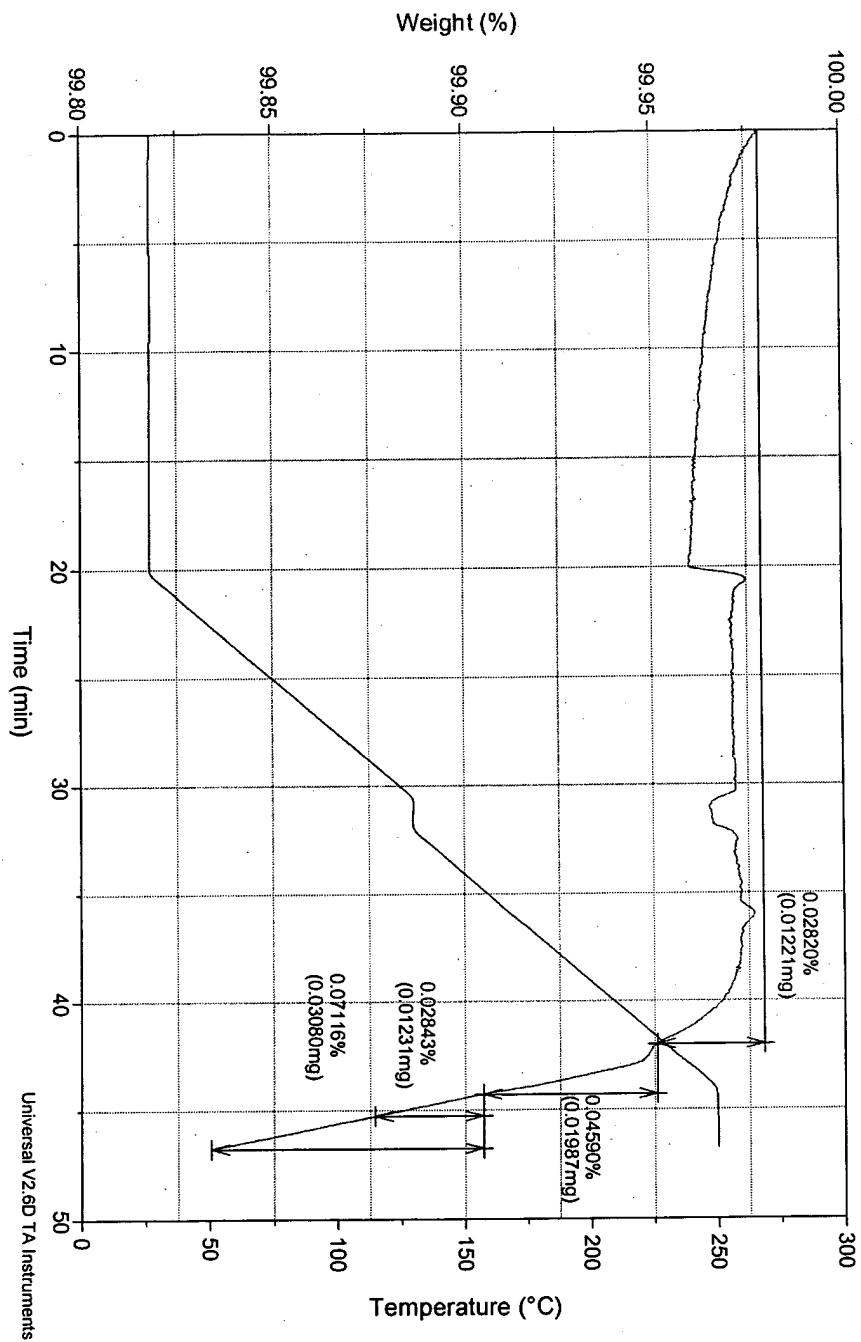


Figure 5

Table 4

| 248 Absorbing Comp. | | 193 Absorbing Comp. | | 193 Absorb. Comp. | | 193 Absorb. Comp. | | 193 Absorb. Comp. | | | | | | |
|---------------------|----------------|---------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------------------|-------------------|-----------|----------|-----------|----------|-----------|-----------|
| Description | | Rev C | +1070ppm APTEOS triflate | +1070ppm APTEOS triflate | +1070ppm APTEOS triflate | +1070ppm APTEOS triflate | +1070ppm APTEOS triflate + 1.5%DPG | | | | | | | |
| pH | | <1 | <1 | <1 | <1 | <1 | <1 | | | | | | | |
| Bake Sequence | 130/200 C | 130/160 C | 130/160 C | 130/200 C | 130/240 C | 130/200 C | 130/200 C | | | | | | | |
| | 50 sec | | | | | | | 90s | | | | | | |
| 500:1 BOE | 1 min @ 20 °C | Pre 3533 | ER [873] | Pre 1676 | ER 268 | Pre 2741 | ER [1098] | Pre 2724 | ER [1071] | Pre 2737 | ER [1026] | Pre 3211 | ER [1532] | |
| | 2.3% aq. TMAH | 23 °C | Pre 3527 | ER 74 | Pre 1690 | ER 0 | Pre 2720 | ER 6 | Pre 2747 | ER 28 | Pre 2710 | ER 29 | Pre 3172 | ER 31 |
| | | 50 °C | Pre 3524 | ER 572 | Pre 1676 | ER 7 | Pre 2722 | ER 4 | Pre 2729 | ER 7 | Pre 2713 | ER 41 | Pre 3199 | ER [2033] |
| 5.0% aq. TMAH | 75 °C | Pre 3540 | ER 1555 | Pre 1676 | ER 28 | Pre 2743 | ER 127 | Pre 2743 | ER 97 | Pre 2692 | ER 61 | Pre 3181 | ER >3181 | |
| | 10.0% aq. TMAH | 23 °C | Pre 3534 | ER [480] | Pre 1681 | ER 8 | Pre 2701 | ER 15 | Pre 2722 | ER 23 | Pre 2702 | ER 16 | Pre 3179 | ER [539] |
| | | 50 °C | Pre 3543 | ER >3488 | Pre 1676 | ER 12 | Pre 2709 | ER 30 | Pre 2717 | ER 58 | Pre 2706 | ER 38 | Pre 3183 | ER >3183 |
| 10.0% aq. TMAH | 75 °C | Pre 3527 | ER >3527 | Pre 1687 | ER 45 | Pre 2715 | ER 272 | Pre 2713 | ER 192 | Pre 2671 | ER 150 | Pre 3166 | ER >3166 | |
| | 10.0% aq. TMAH | 23 °C | Pre 3539 | ER >3477 | Pre 1690 | ER 11 | Pre 2734 | ER 39 | Pre 2741 | ER 35 | Pre 2716 | ER 54 | Pre 3201 | ER [1942] |
| | | 50 °C | Pre 3532 | ER >3532 | Pre 1682 | ER 17 | Pre 2736 | ER 259 | Pre 2749 | ER 224 | Pre 2731 | ER 168 | Pre 3173 | ER >3173 |
| 10.0% aq. TMAH | 75 °C | Pre 3533 | ER >3533 | Pre 1674 | ER 109 | Pre 2701 | ER 515 | Pre 2726 | ER 518 | Pre 2731 | ER 394 | Pre 3186 | ER >3186 | |

Table 5

| Description | | 193 Absorb. Comp. | 193 Absorb. Comp. | 193 Absorb. Comp. | 193 Absorb. Comp. | 193 Absorb. Comp. |
|-------------------|-----------------|--|-------------------------------------|-------------------------------------|-----------------------------|---|
| | | +1070ppm APTEOS triflate + 1.5%DPG | +1070ppm APTEOS triflate + 3%DPG | +1070ppm APTEOS triflate + 3%DPG | 170ppm Ammonium Triflate | 170ppm Ammonium Triflate + 3% DPG |
| pH | | <1 | <1 | <1 | <1 | <1 |
| Bake Sequence | | 130/240 C | 130/200 C | 130/240 C | 130/200 C | 130/240 C |
| 90s | | | | | | |
| 500:1 BOE | 1 min @ 20°C | Pre | ER | Pre | ER | Pre |
| | | 3214 | [1432] | 3507 | [1176] | 3548 |
| | 1 min @ | Pre | ER | Pre | ER | Pre |
| | | 3218 | 123 | 3523 | 83 | 3564 |
| 2.3% aq. TMAH | 23°C | 3184 | 1153 | 3510 | >3510 | 3529 |
| | 50°C | | | 3505 | >3505 | 3519 |
| | 75°C | 3202 | >3202 | | | |
| 5.0% aq. TMAH | 23°C | 3194 | 102 | 3533 | [1125] | 3519 |
| | 50°C | 3175 | >3175 | 3505 | >3505 | 3479 |
| | 75°C | 3165 | >3165 | 3495 | >3495 | 3487 |
| 10.0% aq. TMAH | 23°C | 3200 | [592] | 3563 | [3203] | 3496 |
| | 50°C | 3176 | >3176 | 3504 | >3504 | 3496 |
| | 75°C | 3187 | >3187 | 3534 | >3534 | 3500 |
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Table 6

| Description | | 248 Absorb. Comps. | | 193 Absorb. Comp. | | 193 Absorb. Comp. | | 193 Absorb. Comp. | | 193 Absorb. Comp. | | | |
|----------------|---------------|-------------------------------------|-------|-------------------------------------|--------|--|--------|---|--------|---|--------|---|--------|
| | | +1070ppm APTEOS Triflate + 0.5% DPG | | +1070ppm APTEOS Triflate + 1.5% DPG | | +1070ppm "optimized" APTEOS Triflate + 0.25% DPG | | +1070ppm "optimized" APTEOS Triflate + 0.5% DPG | | +1070ppm "optimized" APTEOS Triflate + 1% DPG | | +1070ppm "optimized" APTEOS Triflate + 1.5% DPG | |
| pH | | N/A | | <1 | | <1 | | <2 | | <2 | | <2 | |
| Bake Sequence | | 130/200 C | | 130/200 C | | 130/200 C | | 130/200 C | | 130/200 C | | 130/200 C | |
| | | 50 sec | | 90 sec | | 90 sec | | 90 sec | | 90 sec | | 90 sec | |
| 500:1 BOE | 1 min @ 20 °C | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER |
| | | 3487 | [977] | 2869 | [1409] | 3177 | [1601] | 2879 | [1512] | 2902 | [1602] | 2907 | [1577] |
| 2.3% aq. TMAH | 1 min @ 23 °C | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER |
| | 23 °C | 3492 | 127 | 2847 | 18 | 3190 | 16 | 2854 | 28 | 2934 | 42 | 2957 | 55 |
| | 50 °C | 3463 | 723 | 2886 | 94 | 3190 | 1805 | 2893 | 279 | 2887 | 447 | 2955 | 798 |
| 5.0% aq. TMAH | 75 °C | 3494 | [987] | 2875 | 861 | 3203 | >3203 | 2864 | [1519] | 2885 | >2779 | 2987 | >2987 |
| | 23 °C | 3496 | [812] | 2893 | 17 | 3182 | 95 | 2853 | 55 | 2898 | 95 | 2927 | 158 |
| | 50 °C | 3520 | >3520 | 2857 | 356 | 3189 | >3189 | 2844 | 739 | 2910 | 1085 | 2932 | [1939] |
| 10.0% aq. TMAH | 75 °C | 3506 | >3506 | 2858 | [1600] | 3184 | >3184 | 2850 | >2771 | 2926 | >2926 | 2926 | >2926 |
| | 23 °C | 3499 | >3499 | 2877 | 163 | 3187 | 2803 | 2871 | 715 | 2967 | [1602] | 2977 | [2258] |
| | 50 °C | 3522 | >3522 | 2848 | [1195] | 3215 | >3215 | 2899 | >2899 | 2906 | >2906 | 2942 | >2942 |
| 10.0% aq. TMAH | 75 °C | 3542 | >3542 | 2851 | >2851 | 3186 | >3186 | 2885 | >2885 | 2897 | >2897 | 2991 | >2991 |
| | | | | | | | | | | | | 2992 | [1991] |
| | | | | | | | | | | | | 2958 | >2958 |
| | | | | | | | | | | | | 2976 | >2976 |

Table 7

| Description | 193 Absorb. Comp. | | 193 Absorb. Comp. | | 193 Absorb. Comp. | | 193 Absorb. Comp. | | 193 Absorb. Comp. | | 193 Absorb. Comp. | | |
|--|-------------------|------|-------------------|------|-------------------|-------|-------------------|-----|-------------------|------|-------------------|------|-----|
| | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | |
| + 170ppm Ammonium Triflate + 0.25% DPG | 2804 | 1102 | 2830 | 1149 | 2931 | 1283 | 2823 | 723 | 383ppm TMAH-MSA | 2816 | 895 | 2777 | 23 |
| + 170ppm Ammonium Triflate + 0.5% DPG | 2821 | 15 | 2821 | 15 | 2924 | 54 | 2812 | 40 | 383ppm TMAH-MSA | 2828 | 40 | 2777 | 19 |
| + 170ppm Ammonium Triflate + 1% DPG | 2835 | 120 | 2835 | 120 | 2881 | 201 | 2769 | 12 | 383ppm TMAH-MSA | 2810 | 18 | 2765 | 23 |
| + 170ppm Ammonium Triflate + 1.5% DPG | 2762 | 415 | 2854 | 678 | 2897 | 1132 | 2755 | 123 | 383ppm TMAH-MSA | 2848 | 293 | 2794 | 209 |
| | 2777 | 29 | 2841 | 27 | 2883 | 40 | 2773 | 11 | 383ppm TMAH-MSA | 2811 | 23 | 2821 | 36 |
| | 2785 | 206 | 2871 | 278 | 2903 | 464 | 2797 | 22 | 383ppm TMAH-MSA | 2852 | 34 | 2763 | 45 |
| | 2809 | 586 | 2843 | 867 | 2937 | 1827 | 2779 | 167 | 383ppm TMAH-MSA | 2824 | 457 | 2804 | 283 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 849 | 2777 | 589 |
| | | | | | | | | | 383ppm TMAH-MSA | | | | |
| | 2785 | 102 | 2840 | 138 | 2885 | 223 | 2770 | 10 | 383ppm TMAH-MSA | 2827 | 29 | 2806 | 34 |
| | 2782 | 605 | 2818 | 775 | 2914 | 1533 | 2843 | 81 | 383ppm TMAH-MSA | 2790 | 840 | 2792 | 610 |
| | 2781 | 1100 | 2846 | 1596 | 2878 | 12878 | 2799 | 441 | 383ppm TMAH-MSA | 2793 | 84 | | |

Table 8

| | | 193 Absorb. Compos. | 193 Absorb. Comp. | 193 Absorb. Comp. | 193 Absorb. Comp. | 193 Absorb. Comp. | 193 Absorb. Comp. | 193 Absorb. Comp. | | | | | | | | |
|-------------------|------------------|--|--|--|---|--|---|---|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-----------|
| Description | | 2140ppm "optimized" APTEOS triflate + 0.16% DPG | 2140ppm "optimized" APTEOS triflate + 0.25% DPG | + 170ppm "optimized" Ammonium triflate + 0.75% DPG | + 170ppm "optimized" Ammonium triflate + 1% DPG | + 225ppm "optimized" Ammonium triflate + 0.75% DPG | + 225ppm "optimized" Ammonium triflate + 1% DPG | + 340ppm "optimized" Ammonium triflate + 1% DPG | | | | | | | | |
| | | <2 | <2 | <2 | <2 | <2 | <2 | <2 | | | | | | | | |
| pH | | | | | | | | | | | | | | | | |
| Bake Sequence | | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | | | | | | | | |
| | | 90 sec | | | 90 sec | | | 90 sec | | | | | | | | |
| 500:1 BOE | 1 min @ 20 °C | Pre 2970 | ER [1527] | Pre 2933 | ER [1313] | Pre 2902 | ER [1272] | Pre 2938 | ER [1314] | Pre 2970 | ER [1396] | | | | | |
| | TMAH | 1 min @ | Pre 2995 | ER 78 | Pre 2962 | ER 76 | Pre 2905 | ER 70 | Pre 2913 | ER 64 | Pre 2935 | ER 88 | Pre 2949 | ER 63 | | |
| | 2.3% aq. TMAH | 23 °C | Pre 2965 | ER 248 | Pre 2947 | ER 195 | Pre 2929 | ER 171 | Pre 2929 | ER 211 | Pre 2908 | ER 167 | Pre 2932 | ER 220 | Pre 2951 | ER 215 |
| | 75 °C | Pre 2970 | ER [1608] | Pre 2946 | ER 1166 | Pre 2914 | ER 1035 | Pre 2959 | ER 1341 | Pre 2941 | ER 1077 | Pre 2962 | ER 1369 | Pre 2998 | ER 1565 | |
| 5.0% aq. TMAH | 23 °C | Pre 2959 | ER 137 | Pre 2932 | ER 103 | Pre 2905 | ER 87 | Pre 2924 | ER 90 | Pre 2936 | ER 91 | Pre 2929 | ER 133 | Pre 2960 | ER 105 | |
| | 50 °C | Pre 2968 | ER 591 | Pre 2942 | ER 462 | Pre 2915 | ER 405 | Pre 2914 | ER 486 | Pre 2923 | ER 412 | Pre 2980 | ER 567 | Pre 2991 | ER 548 | |
| | 75 °C | Pre 2943 | ER [2608] | Pre 2983 | ER 1565 | Pre 2948 | ER 1398 | Pre 2932 | ER [2138] | Pre 2945 | ER [1664] | Pre 2940 | ER [2166] | Pre 2974 | ER [2974] | |
| 10.0% aq. TMAH | 23 °C | Pre 2962 | ER 186 | Pre 2937 | ER 147 | Pre 2915 | ER 99 | Pre 2944 | ER 124 | Pre 2919 | ER 124 | Pre 2962 | ER 117 | Pre 2989 | ER 189 | |
| | 50 °C | Pre 3012 | ER 1616 | Pre 2950 | ER 1187 | Pre 2934 | ER 1028 | Pre 2978 | ER 1274 | Pre 2909 | ER 1170 | Pre 2908 | ER 1253 | Pre 3008 | ER 1476 | |
| | 75 °C | Pre 2966 | ER [2966] | Pre 2971 | ER [2971] | Pre 2879 | ER [2879] | Pre 2923 | ER [2923] | Pre 2932 | ER [2952] | Pre 2937 | ER [2937] | Pre 2972 | ER [2972] | |

Table 9

| 248 | | 193 | | 193 | | 193 | | 193 | | 193 | | 193 | | 193 | |
|-------------------|---|---|---|---|--|--|---|-----------|--|-----------|-----------|-----------|-----------|-----------|-----------|
| Absorb. | | Absorb. | | Absorb. | | Absorb. | | Absorb. | | Absorb. | | Absorb. | | Absorb. | |
| Comp. | | Comp. | | Comp. | | Comp. | | Comp. | | Comp. | | Comp. | | Comp. | |
| Description | 1070ppm "optimized" APTEOS triflate + 0% DPG | + 1070ppm "optimized" APTEOS triflate + 0.16% DPG | + 1070ppm "optimized" APTEOS triflate + 0.16% DPG | + 1070ppm "optimized" APTEOS triflate + 0.25% DPG | + 1600ppm "optimized" APTEOS triflate + 0.08% DPG | + 1600ppm "optimized" APTEOS triflate + 0.16% DPG | + 1600ppm "optimized" APTEOS triflate + 0.25% DPG | + | 1600ppm "optimized" APTEOS triflate + 0.25% DPG | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| pH | N/A | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | | | | | | |
| Bake Sequence | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C | 130/200 C |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 500:1 BOE | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TMAH | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 2.3% aq. TMAH | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 5.0% aq. TMAH | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 10.0% aq. TMAH | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre | ER | Pre |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

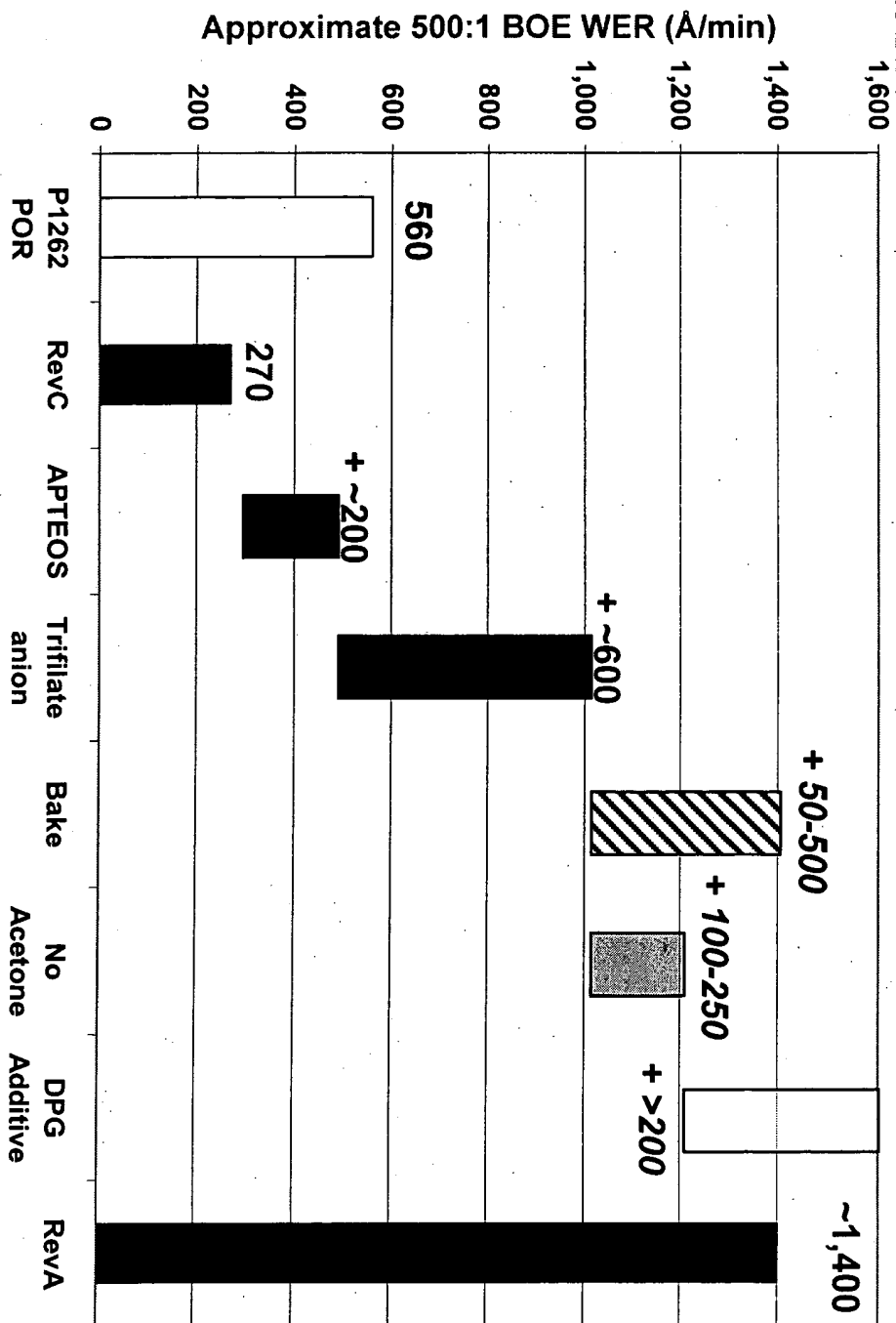


Figure 6

| 248 | | 193 | | 193 | | 193 | | 193 | |
|--|--------|---------------------------|--|---------------------------|--|------------------------------------|--|------------------------------------|--|
| Absorb. Composition | | Absorb. Composition | | Absorb. Composition | | Absorb. Composition | | Absorb. Composition | |
| Descriptions | | + 1070ppm APTEOS tosylate | | + 1070ppm APTEOS tosylate | | + 1070ppm APTEOS tosylate + 5% DPG | | + 1070ppm APTEOS tosylate + 5% DPG | |
| pH | | 1.5 | | <1 | | <1 | | <1 | |
| Bake temp. (C)/Time (Sec) | | 150/250C -- 50sec | | 130/240C -- 90sec | | 130/200C -- 90sec | | 130/240C -- 90sec | |
| Metrics | | ER (A/min) | | ER (A/min) | | ER (A/min) | | ER (A/min) | |
| 2.5% TMAH @ 21°C | 1 min | 210 | | 12 | | 10 | | 53 | |
| | 2 min | 167 | | 12 | | 4 | | 42 | |
| 500:1BOE @ 21°C | 30 sec | 1224 | | 1440 | | [880] | | [2405] | |
| | 1 min | 1000 | | >1215 | | 845 | | >1309 | |
| | 2 min | [880] | | >673 | | >689 | | >656 | |
| ER: Etch Rate (A/min); | | | | | | | | | |
| Pre: Pre-Immersion SOG Film Average Thickness in Angstrom; | | | | | | | | | |
| ER > 1000A/min. | | | | | | | | | |
| ER < 1000A/min. | | | | | | | | | |
| > Bare Si post-etch. | | | | | | | | | |
| [] Post-etch film is highly non-uniformed. | | | | | | | | | |

Table 10

248 Absorb. Composition 193 Absorb. Compos. 193 Absorb. Composition

| Descriptions | | | RevA + 383ppm TMAH triflate | RevA + 383ppm TMAH tosylate |
|---------------------------|---|-------------------|--------------------------------|--------------------------------|
| pH | | N/A | <1 | <1 |
| Bake temp. (C)/Time (Sec) | | 130/200C -- 50sec | 130/240C -- 90sec | 130/240C -- 90sec |
| Metrics | | ER (A/min) | ER (A/min) | ER (A/min) |
| 2.5% TMAH @ 21°C | 1 min | 210 | 11 | 16 |
| | 2 min | 167 | 4 | 8 |
| 500:1BOE @ 21°C | 30 sec | 1224 | 969 | 689 |
| | 1 min | 1000 | 844 | 647 |
| | 2 min | [880] | [854] | 665 |
| | | | | |
| ER: | Etch Rate (A/min); | | | |
| Pre: | Pre-Immersion SOG Film Average Thickness in Angstrom; | | | |
| | ER > 1000A/min. | | | |
| | ER < 1000A/min. | | | |
| > | Bare Si post-etch. | | | |
| [] | Post-etch film is highly non-uniformed. | | | |

Table II

Table 12

| | "N" wt / Si comp. Wt (ppm) | "N" mole / Si comp. Wt (ppm) | "N" mole / Si comp. Wt (ppm) (consider 95% TMAA and 96% TMAN) |
|---------|-------------------------------|---------------------------------|---|
| AS_TMAA | 589 | 4.422 | 4.201 |
| TMAN | 601.2 | 4.416 | 4.239 |

Table 13

193 Absorbing Composition + TMAA

| Bake temp. (C)/Time (Sec) | | 130/150C -- 90sec | 130/175C -- 90sec | 130/200C -- 90sec | 130/225C -- 90sec | 130/250C -- 90sec |
|---------------------------|--------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Metrics | | ER (A/min) | ER (A/min) | ER (A/min) | ER (A/min) | ER (A/min) |
| 2.5% TMAH @ 21°C | 1 min | -1 | 5 | -7 | -2 | -3 |
| | 6 min | 0.4 | -0.6 | -0.4 | -0.2 | -0.9 |
| PGMEA @ 21°C | 30 sec | 358 | 251 | 206 | 165 | 144 |
| | 1 min | 331 | 273 | 215 | 191 | 176 |

248
Absorb.
Comp.

193 Absorbing Comp. + TMAN

| Bake temp. (C)/Time (Sec) | | 130/150C -- 90sec | 130/175C -- 90sec | 130/200C -- 90sec | 130/225C -- 90sec | 130/250C -- 90sec | 130/200C -- 60sec |
|---------------------------|--------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Metrics | | ER (A/min) | ER (A/min) | ER (A/min) | ER (A/min) | ER (A/min) | ER (A/min) |
| 2.5% TMAH @ 21°C | 1 min | 1 | -3 | -1 | 1 | 3 | 882 |
| | 6 min | -0.7 | -0.2 | -0.7 | 0.1 | -0.1 | 21 |
| PGMEA @ 21°C | 30 sec | 574 | 403 | 261 | 238 | 186 | 1140 |
| | 1 min | 552 | 413 | 312 | 244 | 198 | 983 |

Spin Coated @ 7PM on 5/22/03; Wet Process

Figure 7

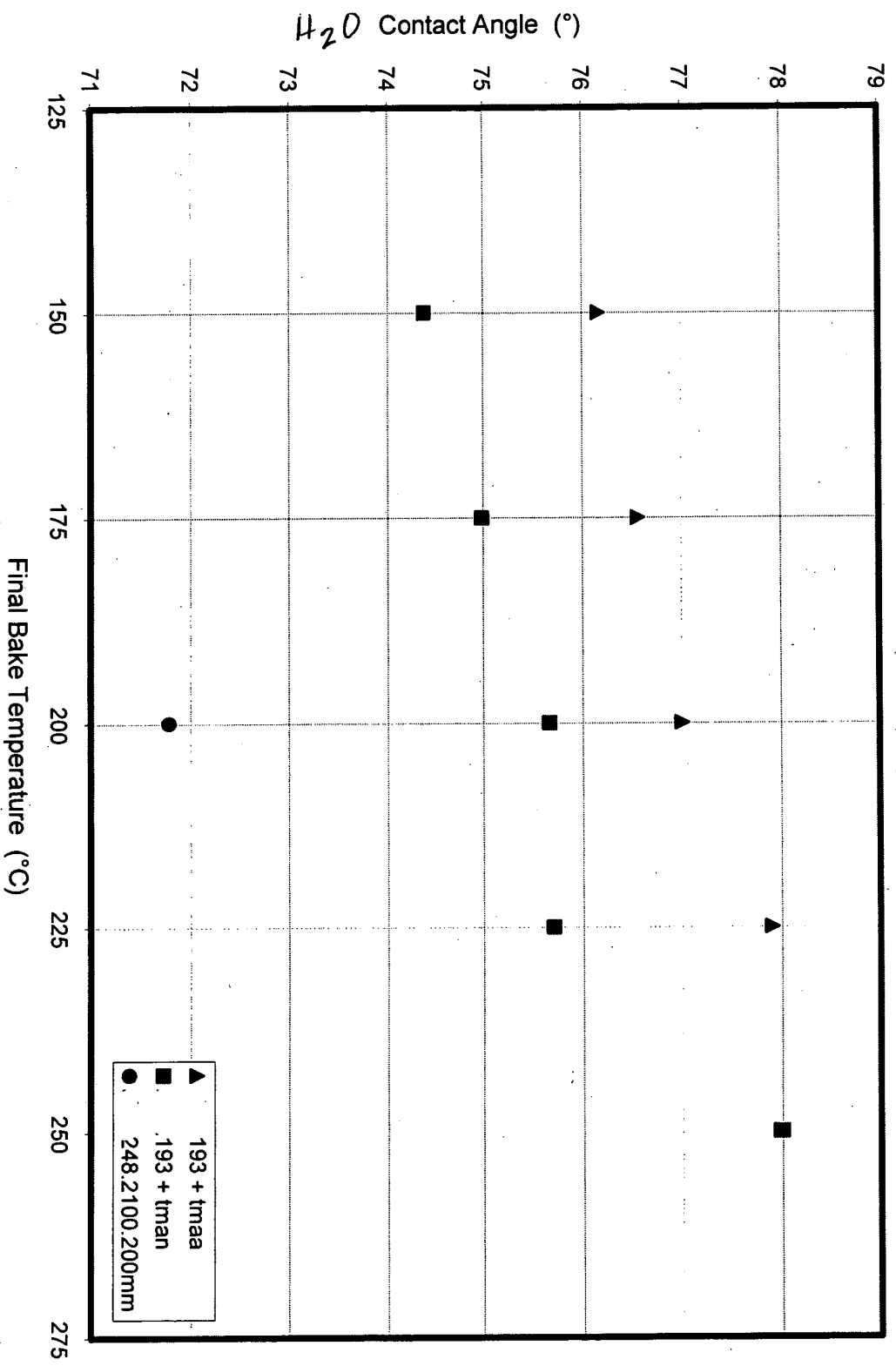
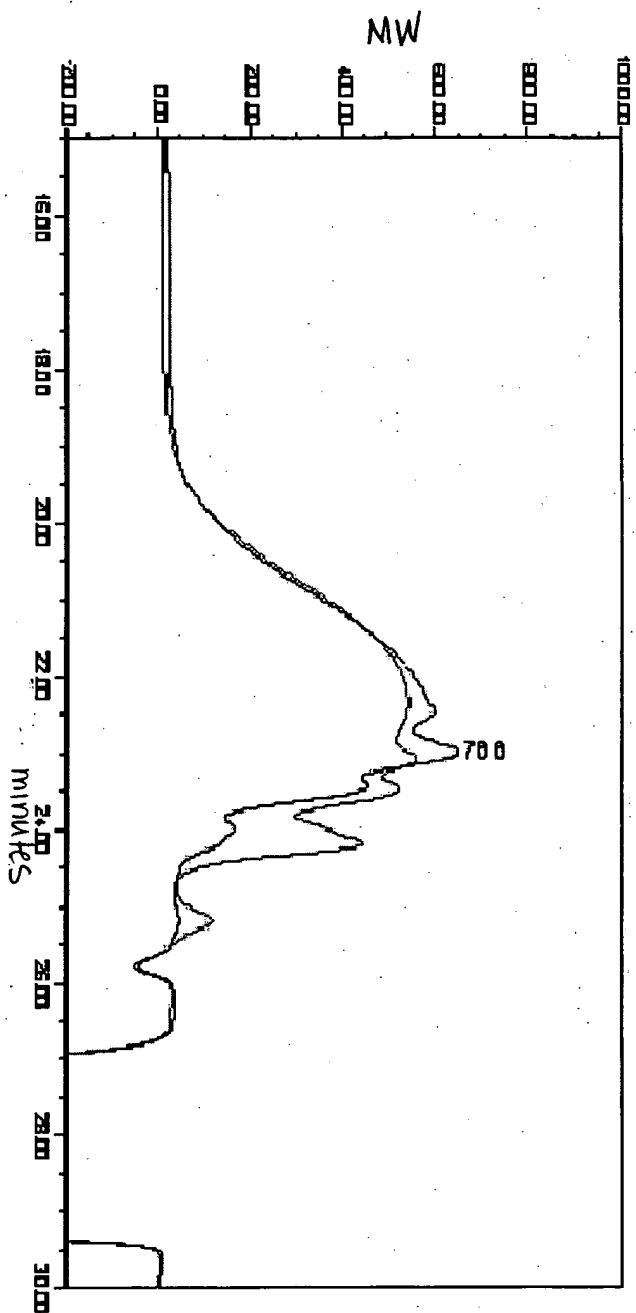


Figure 8



| Product (Absorb. Comp.) | Mn | Mw | Mp | Mz | Mz+1 | Polydispersity |
|-------------------------------|------|------|-----|------|------|----------------|
| 193 + 600ppm Acidified TMAA | 865 | 1183 | 737 | 1590 | 2012 | 1.367 |
| w/ TMAA (after 5 days @ 40 C) | 1021 | 1316 | 766 | 1671 | 2032 | 1.289 |
| 193 + 600ppm TMAN | 789 | 1151 | 727 | 1582 | 1999 | 1.458 |
| w/ TMAN (after 5 days @ 40 C) | 848 | 1244 | 731 | 1706 | 2139 | 1.467 |

Figure 10

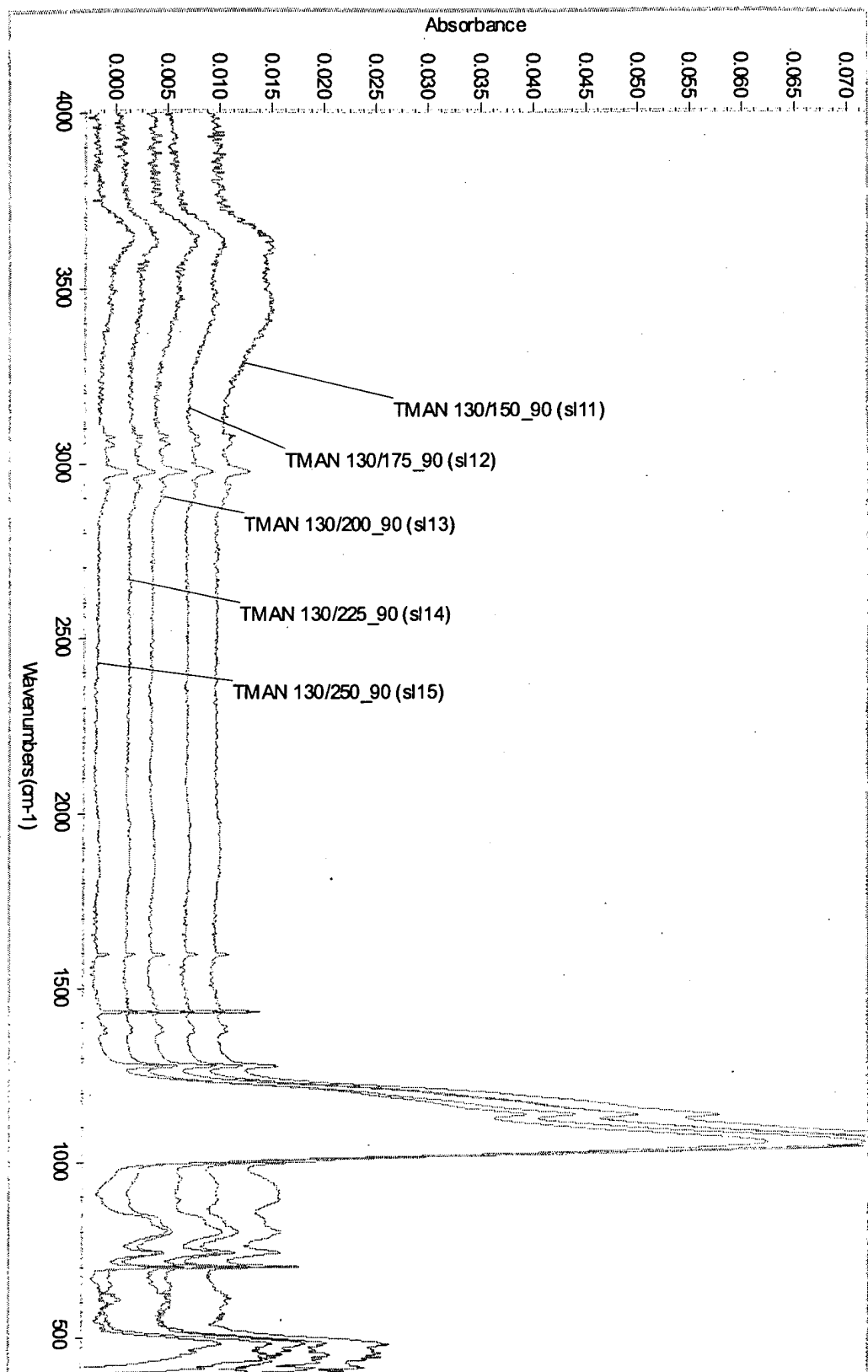


Figure 11

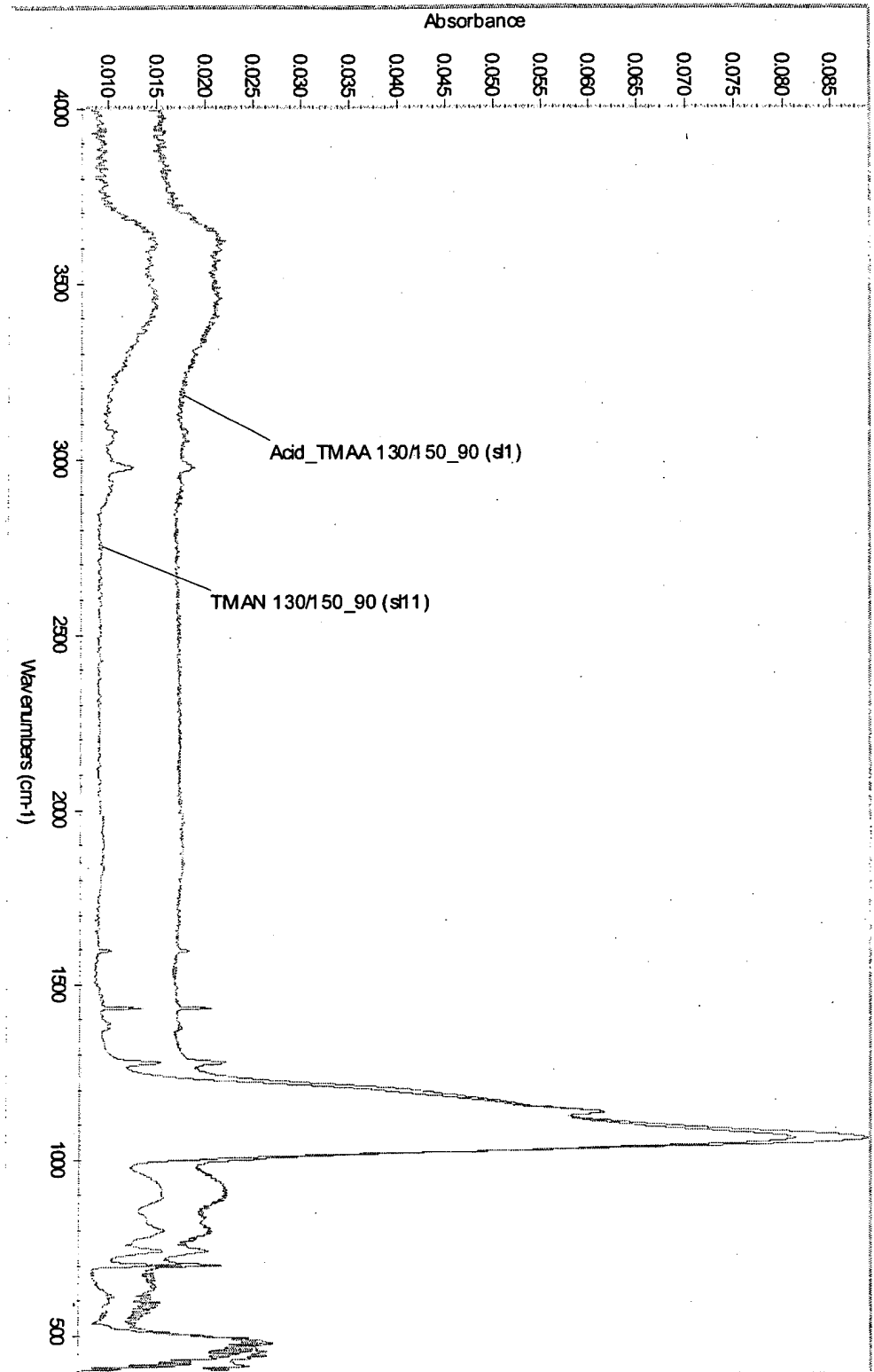


Figure 12

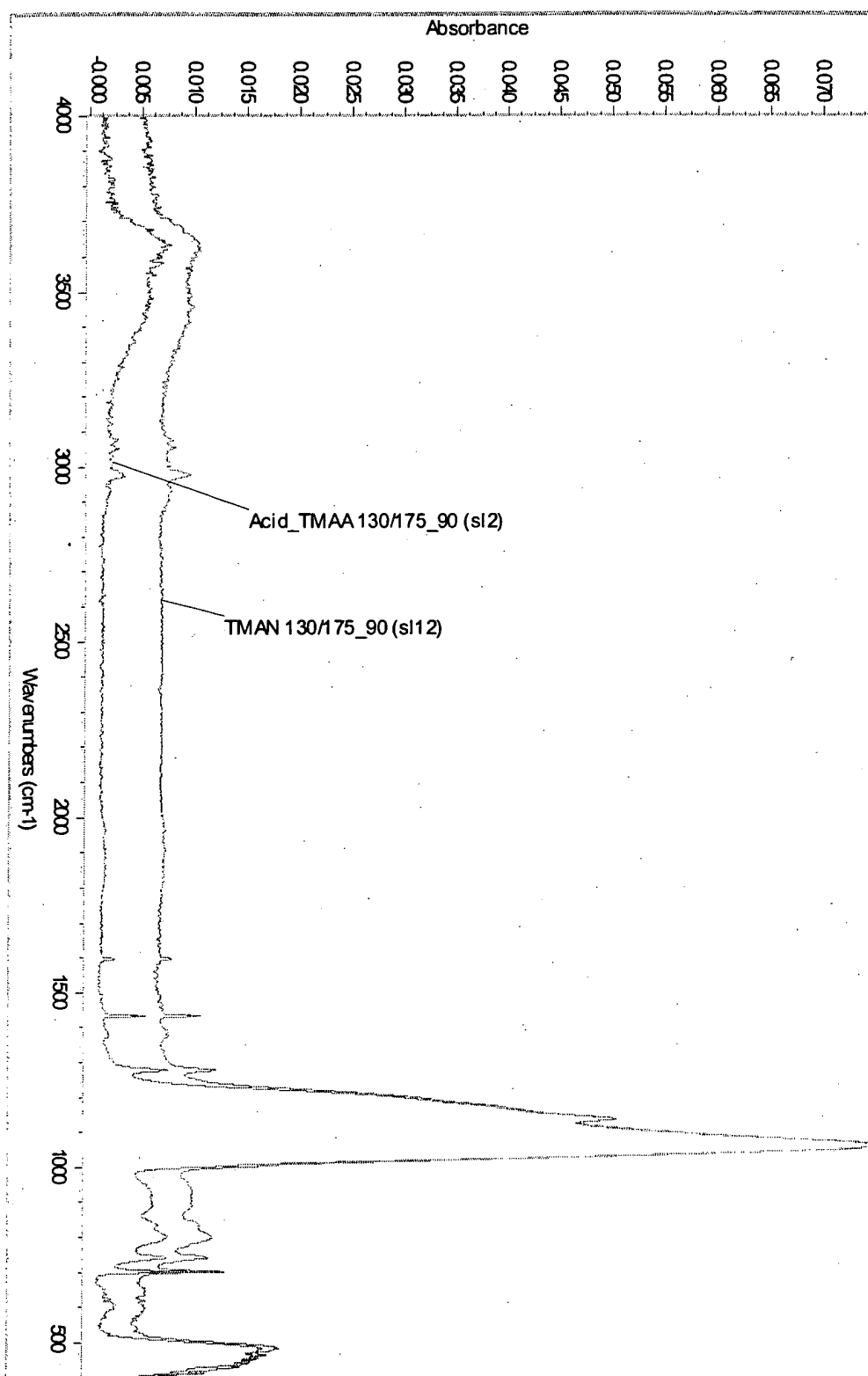


Figure 13

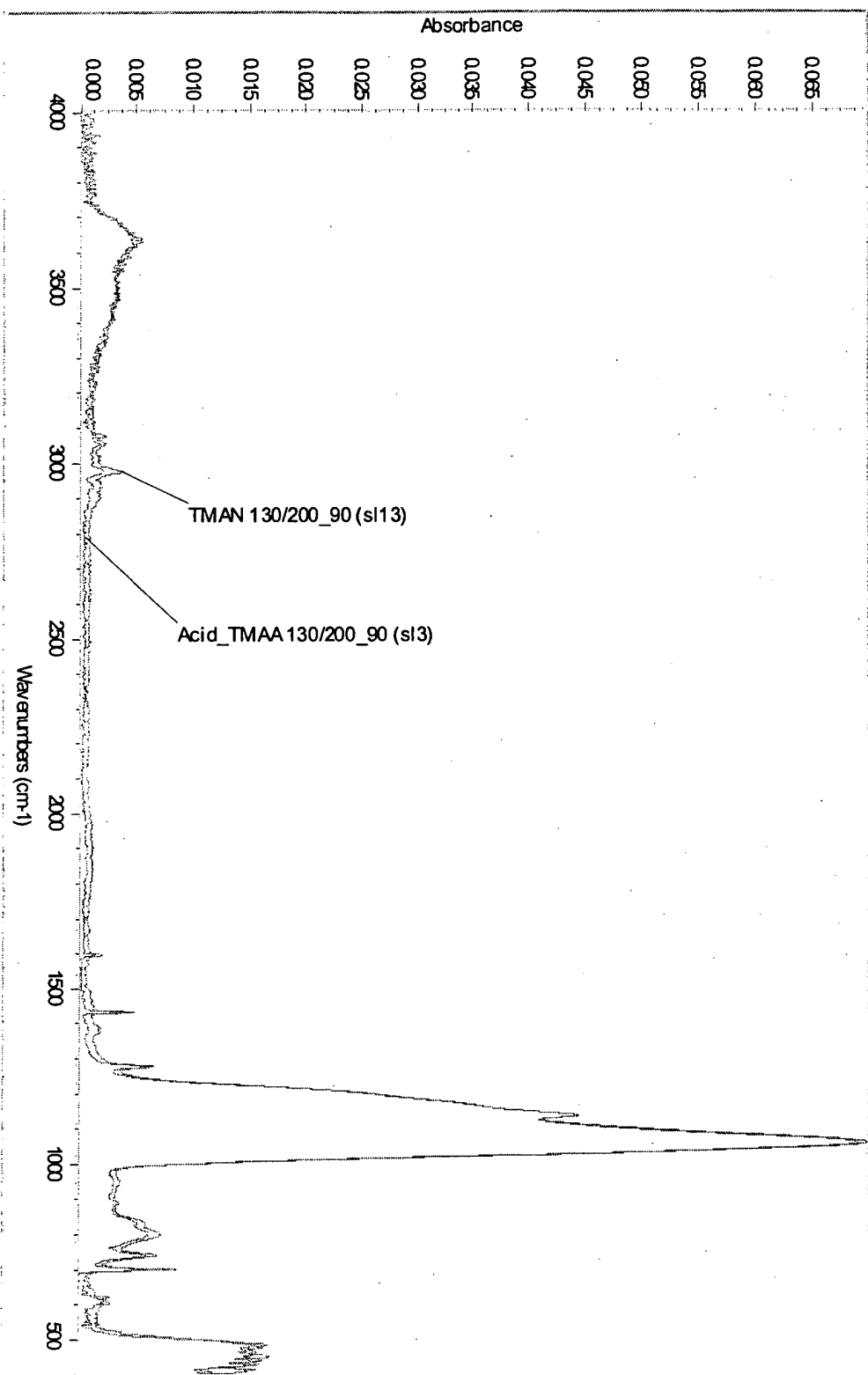


Figure 14

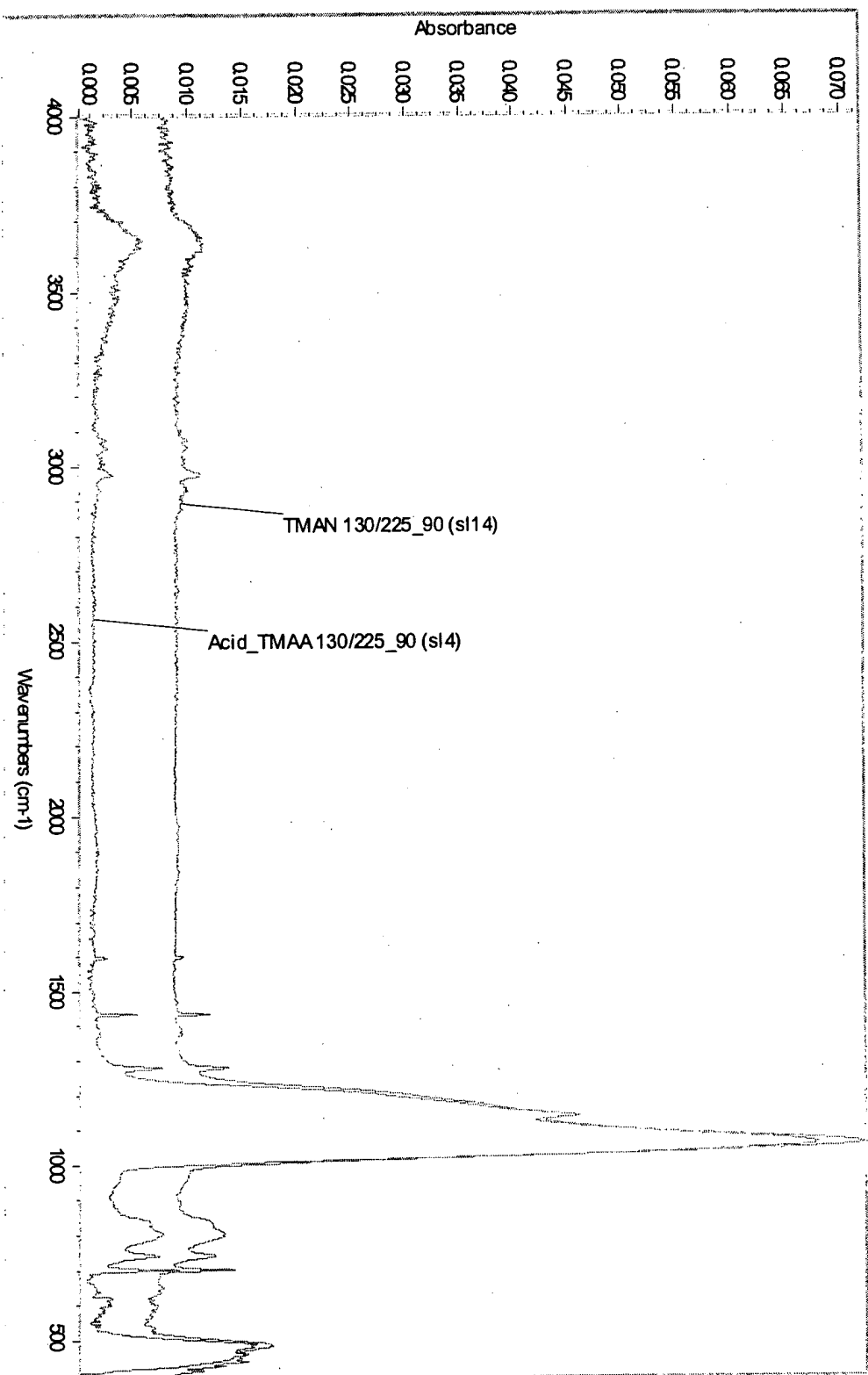


Figure 15

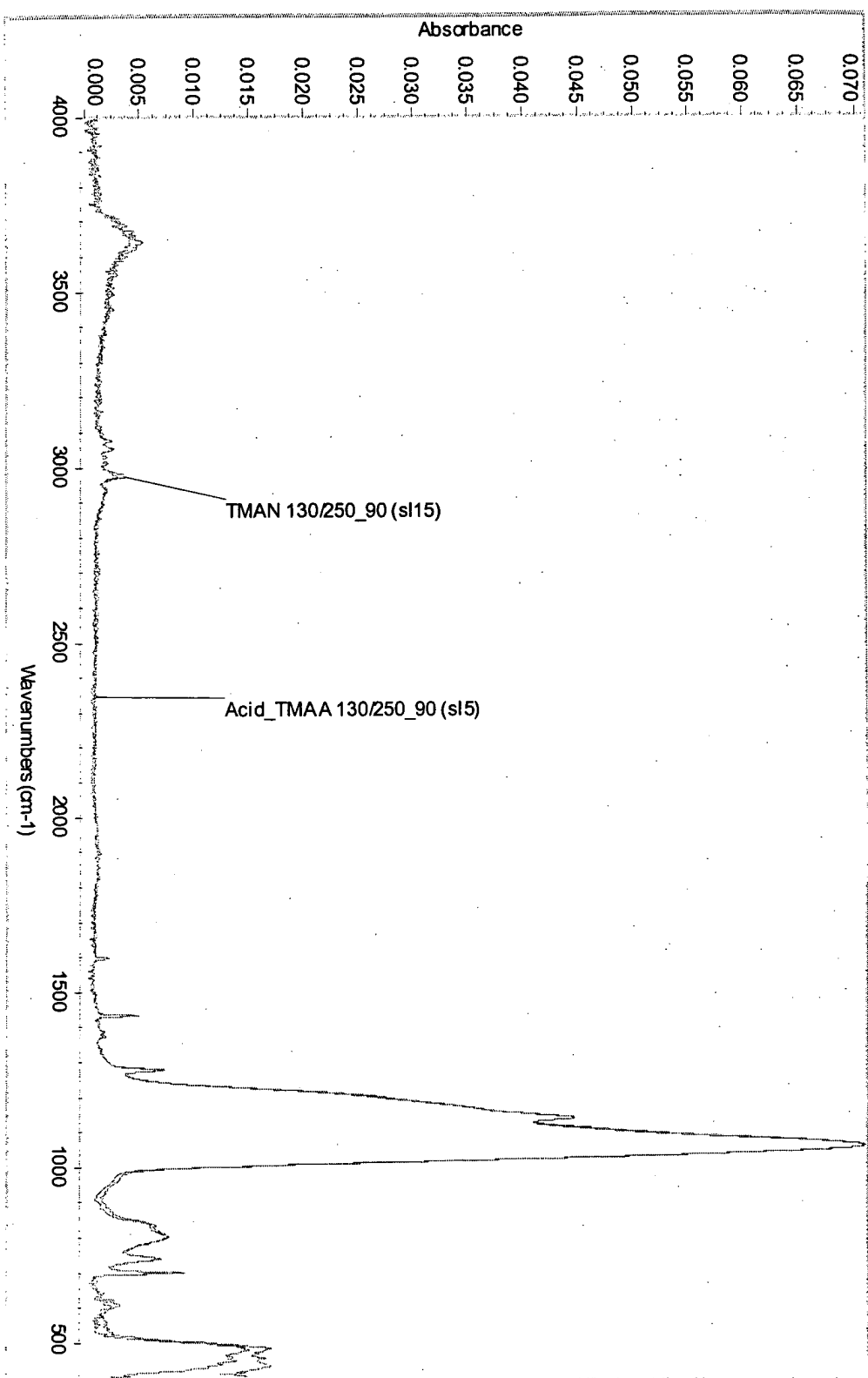


Figure 16

¹⁹³Asorb. Composition

Stabilized TMAA -vs- TMAN: Mw -vs- Aging

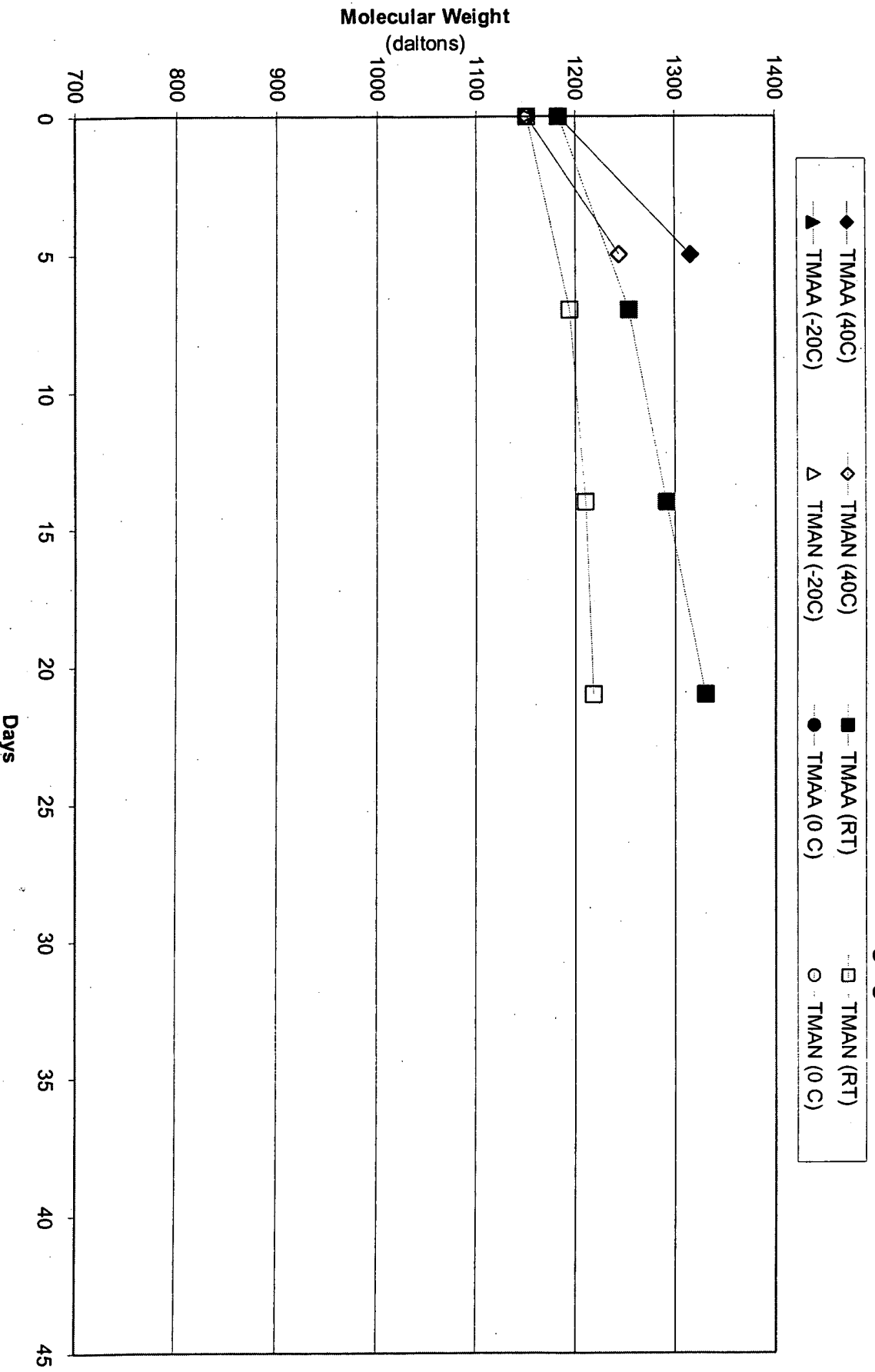
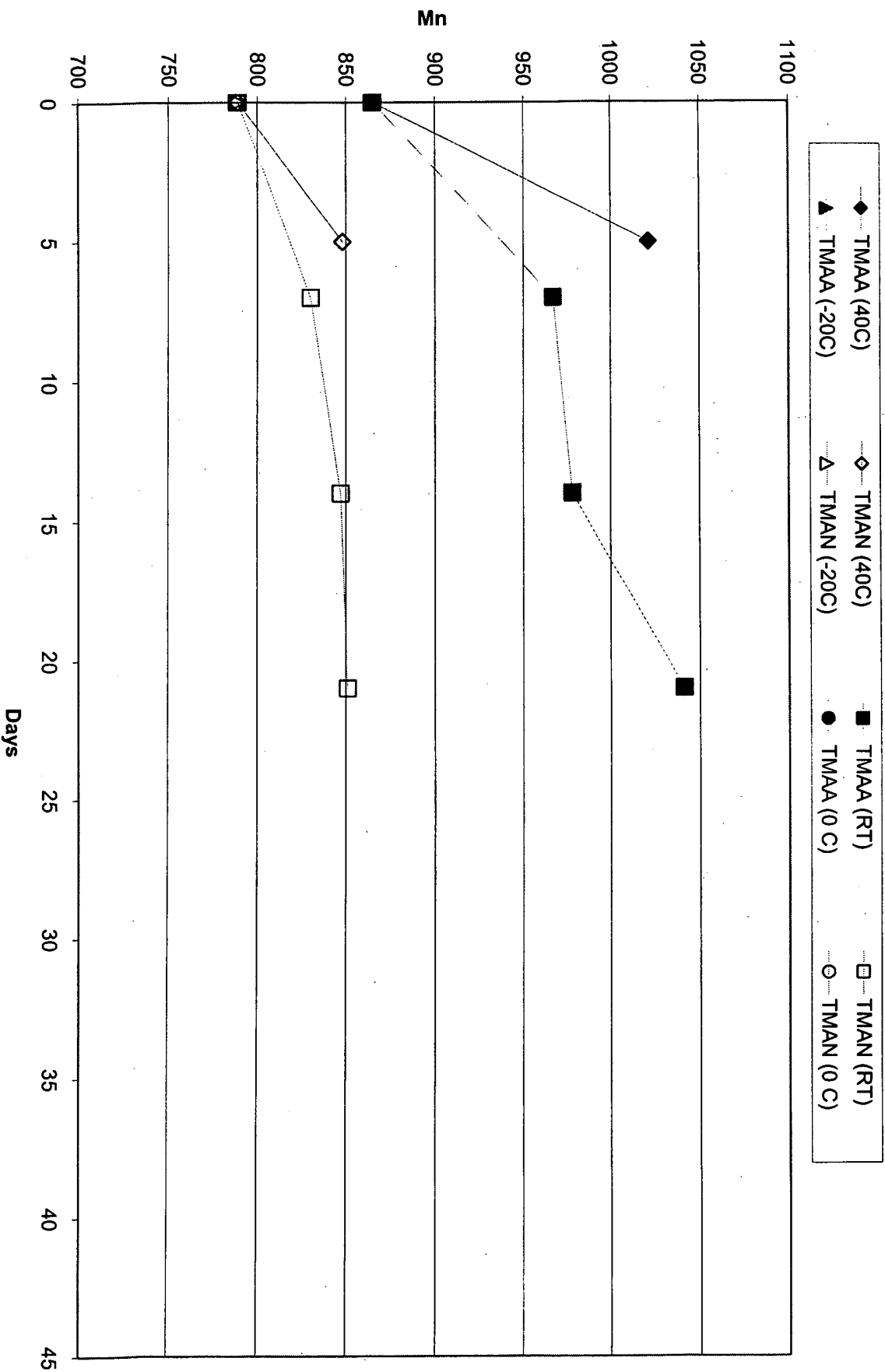


Figure 17

193 Absorb. Comp.

Stabilized TMAA -vs- TMAN: Mn -vs- Aging



193 Absorb. Comp.

Stabilized TMAA -vs- TMAN: Film Thickness -vs- Aging

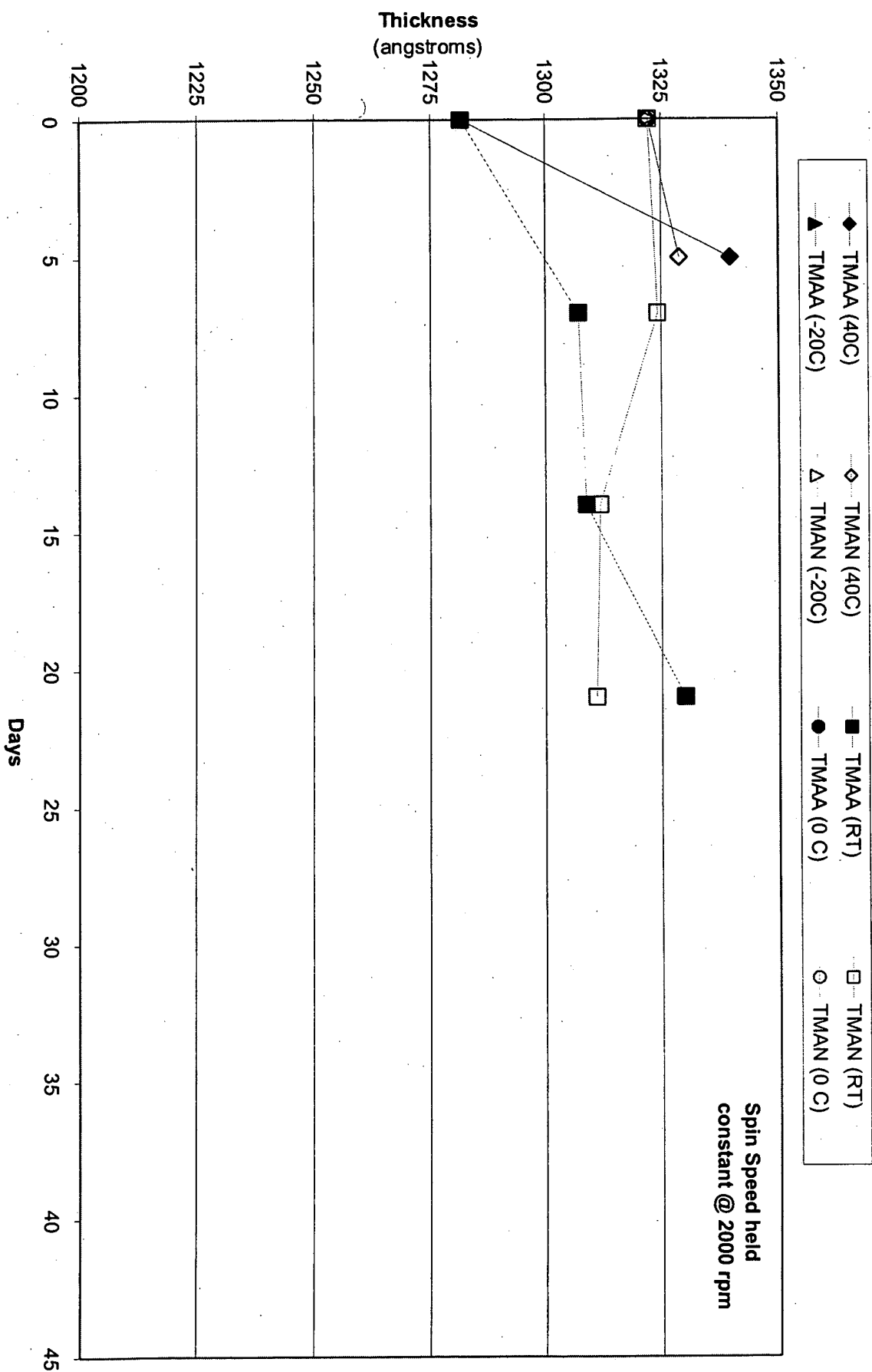


Figure 19

193Absorb. Comp. Stabilized TMAA -vs- TMAN: Reflectance @ 193nm -vs- Aging

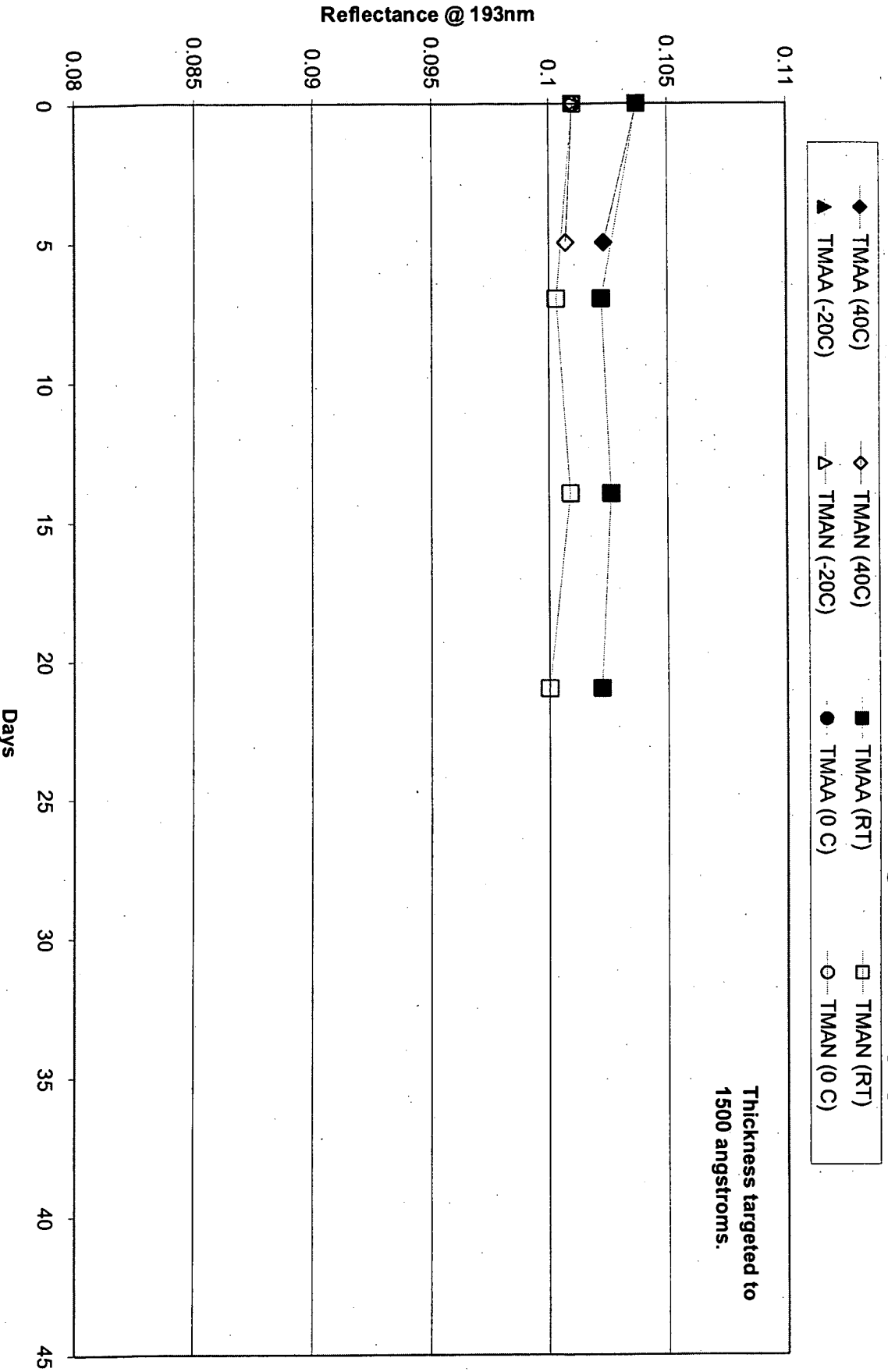


Figure 20

193 Abs. Comp.

Stabilized TMAA -vs- TMAN: Refractive Index @ 193nm -vs- Aging

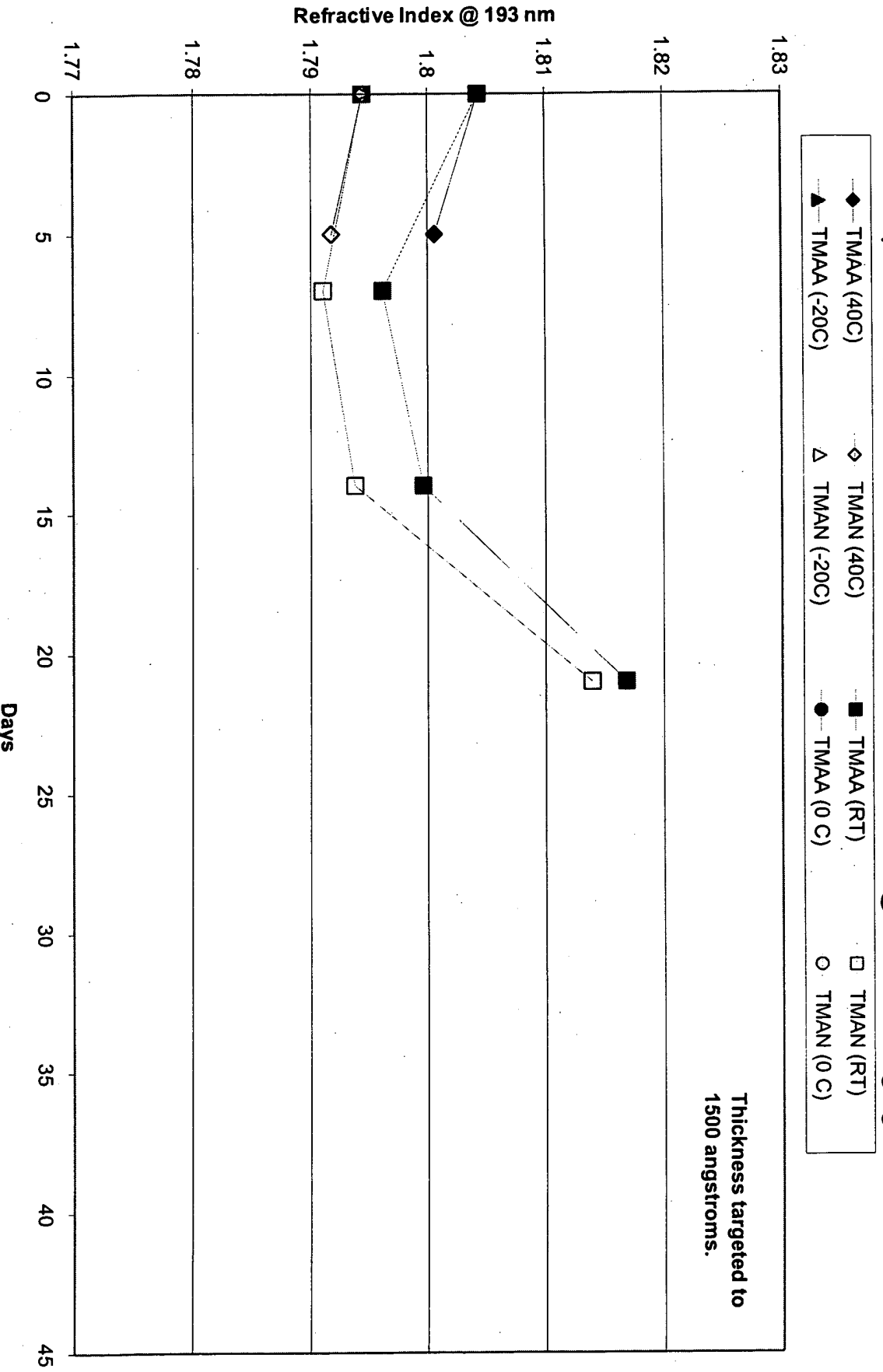


Figure 21

193 Absorb. Comp.

Stabilized TMAA -vs- TMAN: Extinction Coefficient @ 193nm -vs- Aging

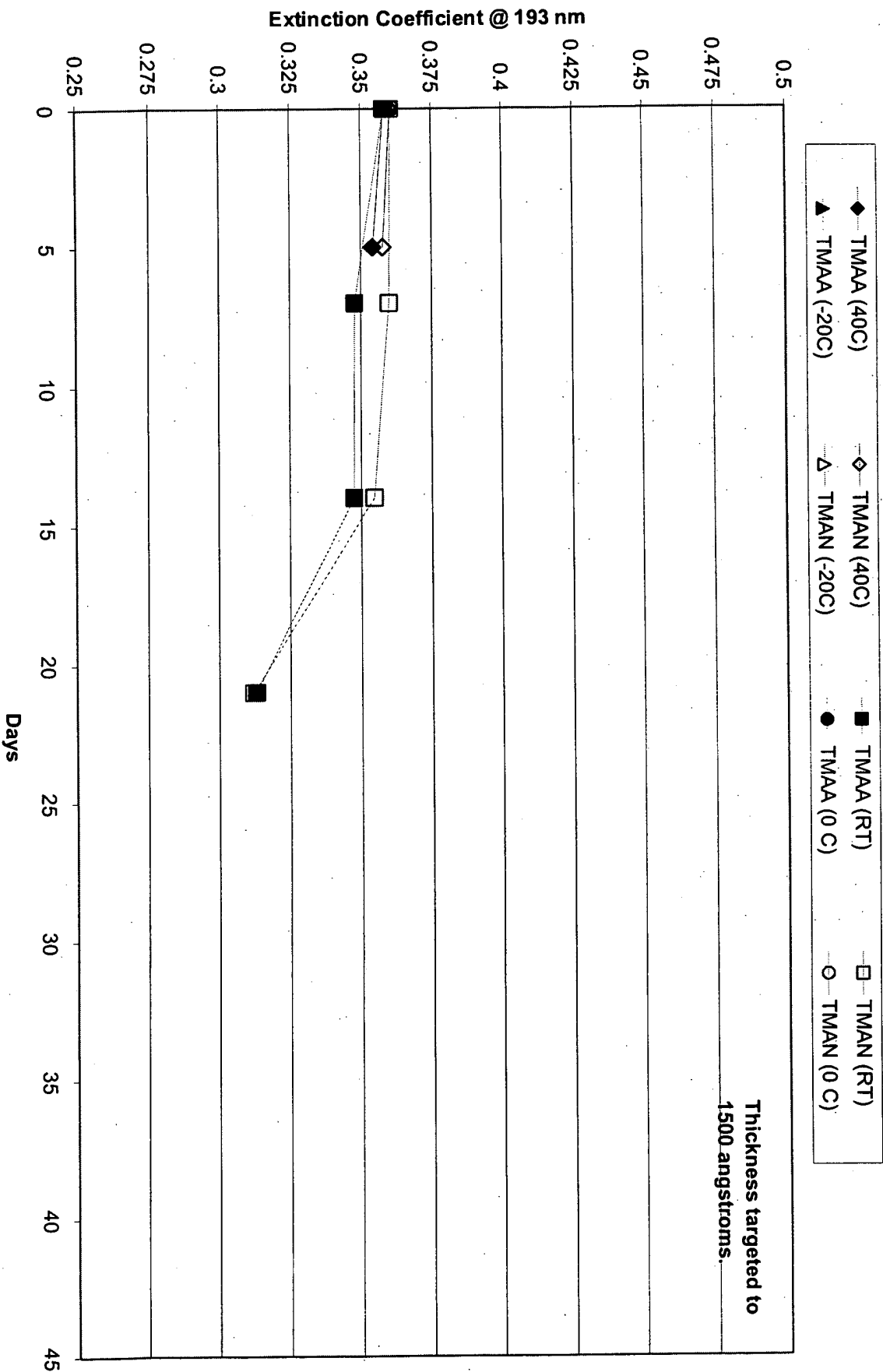
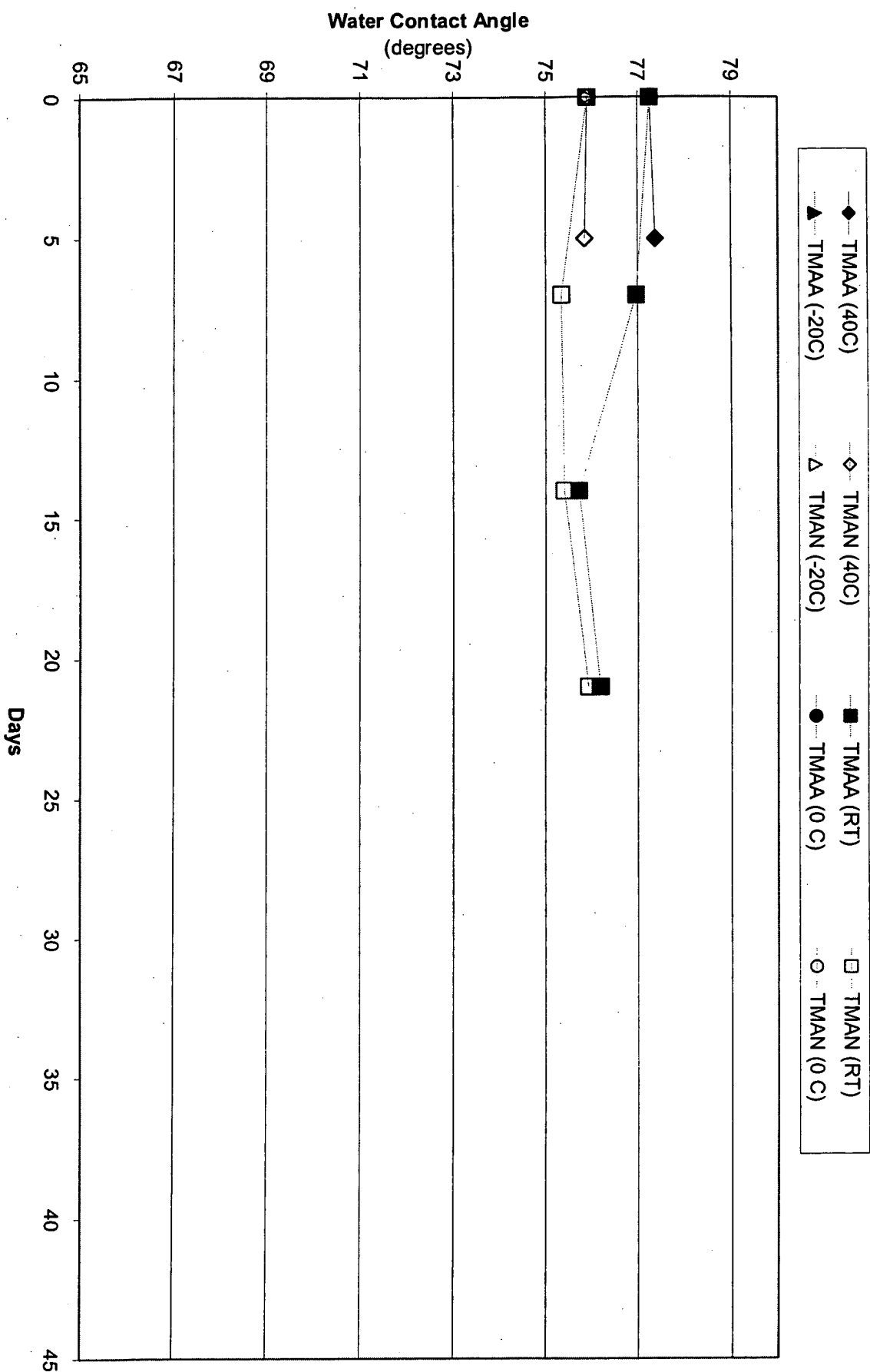


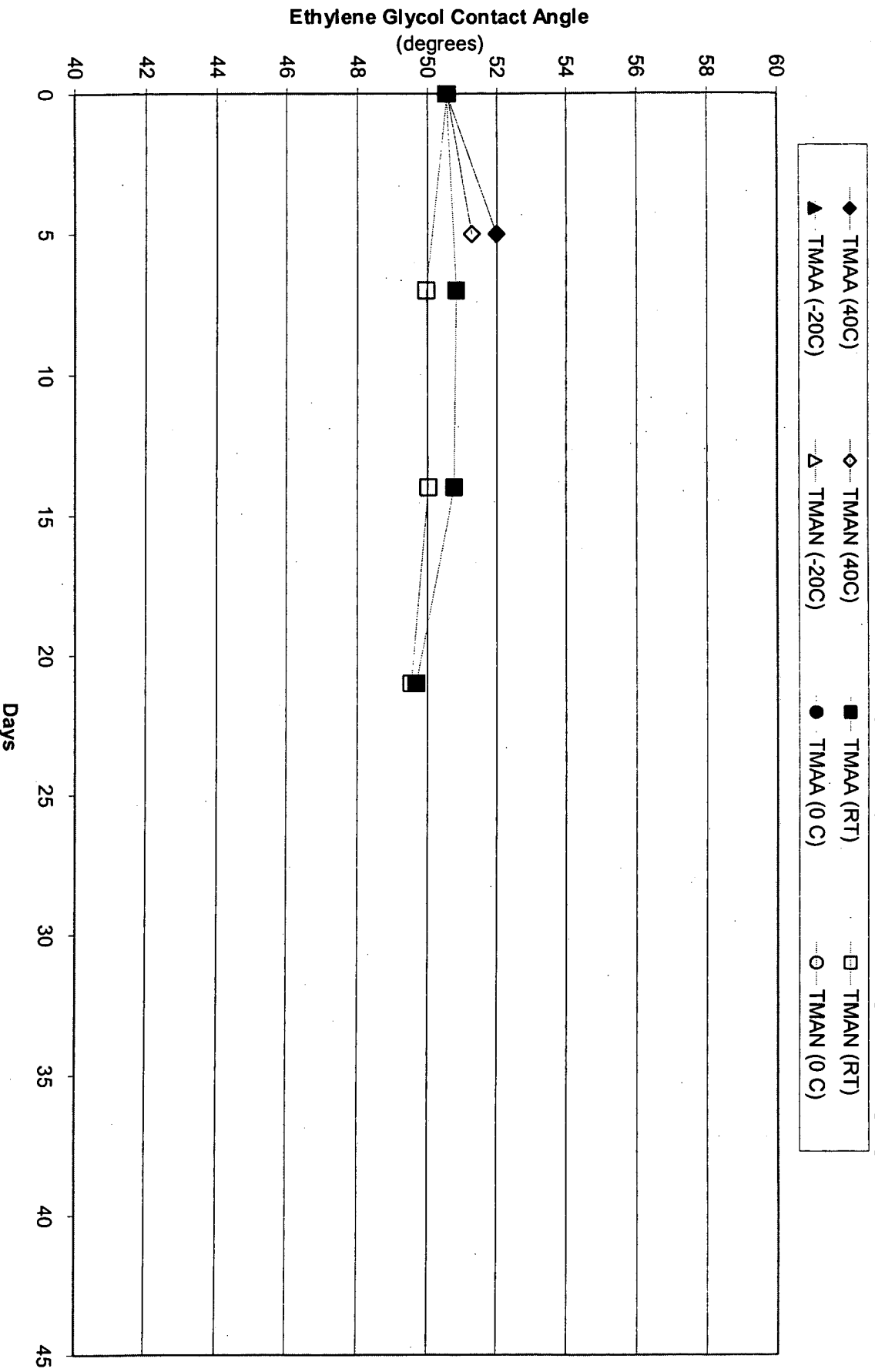
Figure 22

193 Absorb. Comp. Stabilized TMAA -vs- TMAN: Water Contact Angle -vs- Aging



193 Abs. Comp.

193 Abs. Comp.



193 Abs. Comp.

Stabilized TMAA -vs- TMAN: TMAH Resistance -vs- Aging

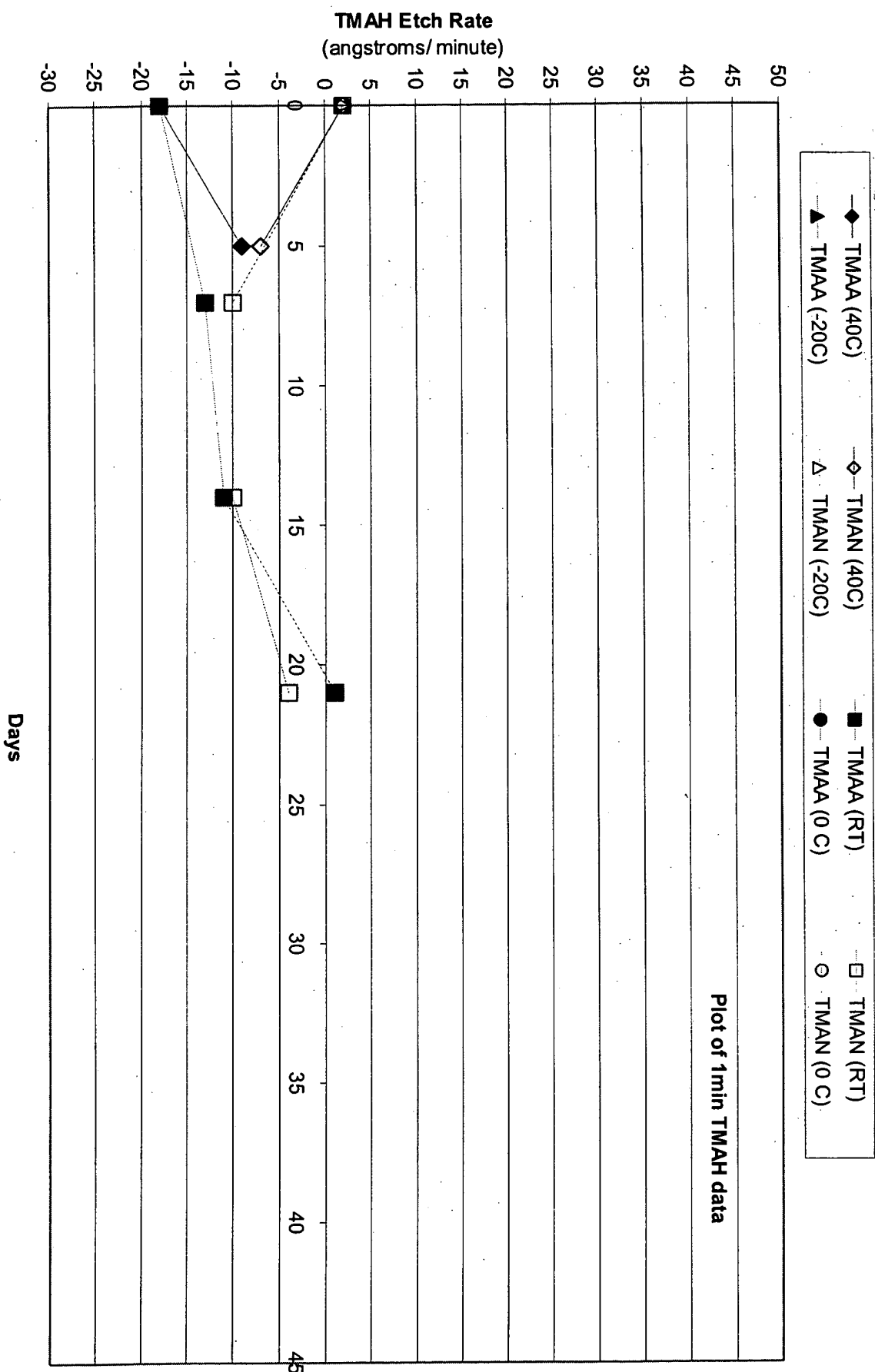


Figure 25

198 Abs. Comp. Stabilized TMAA -vs- TMAN: 500:1 BOE strip rate -vs- Aging

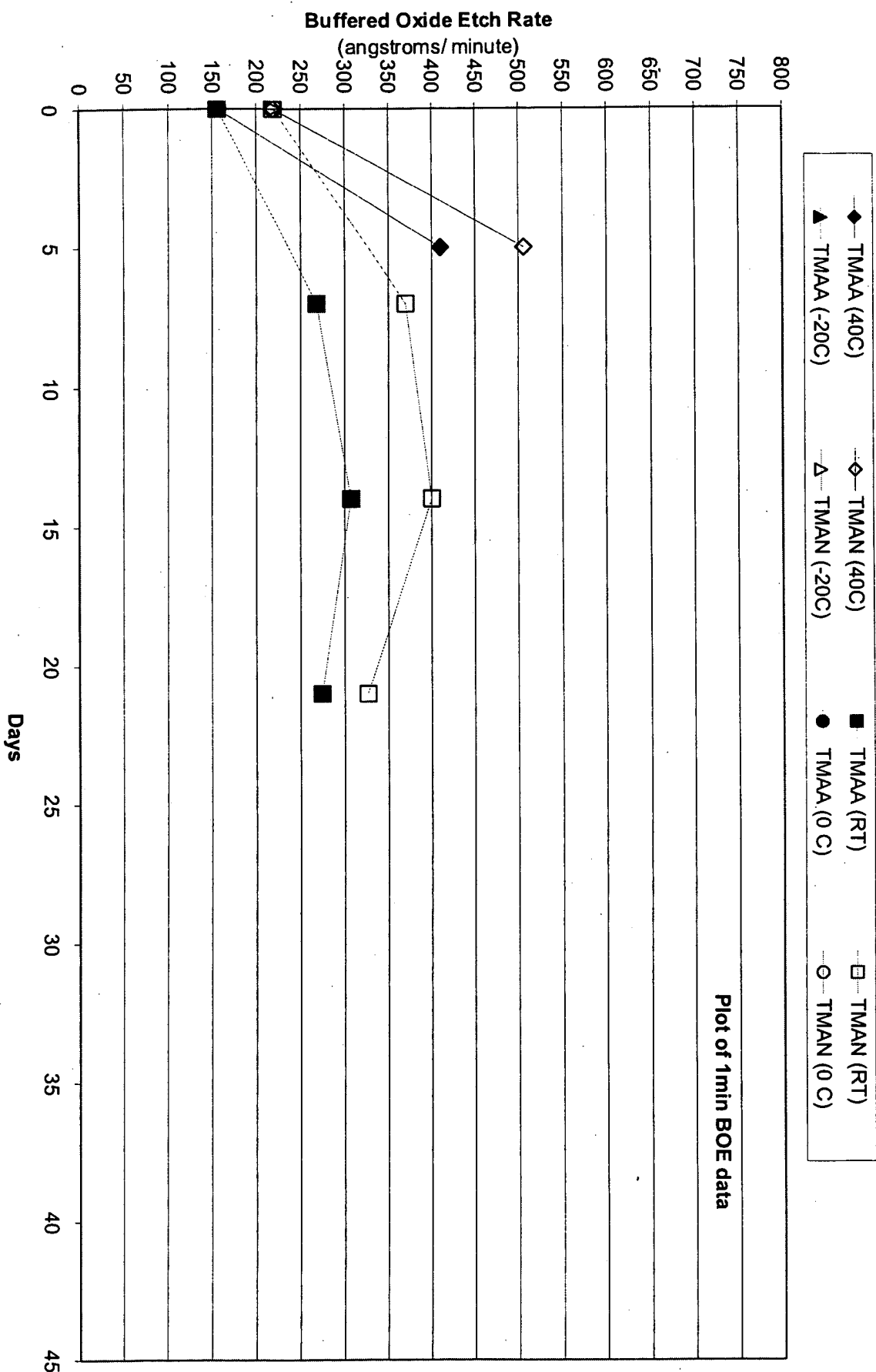


Table 14

193 Absorbing Composition 248 Abs. Comp.

| Descriptions | + 600ppm TMAN | + 600ppm Stabilized TMAA | |
|---------------------------|-------------------|--------------------------|-------------------|
| pH | 1.7 | 0.5 | N/A |
| Bake temp. (C)/Time (Sec) | 130/240C -- 90sec | 130/240C -- 90sec | 130/200C -- 50sec |
| DI Water Contact Angle | 78.7 | 78.9 | 74.9 |
| Metrics | ER (A/m In) | ER (A/m In) | ER (A/m In) |
| 2.5% TMAH @ 21°C | 1 m in | -7 | -9 |
| | 2 m in | -8 | -10 |
| | 30 sec | 263 | 277 |
| 500:1BOE @ 21°C | 1 m in | 506 | 410 |
| | 2 m in | 413 | 366 |
| | | | 720 |
| DI Water Contact Angle | 77.5 | 78 | 74.2 |
| Metrics | ER (A/m In) | ER (A/m In) | ER (A/m In) |
| 2.5% TMAH @ 21°C | 1 m in | -10 | -13 |
| | 2 m in | -8 | -1 |
| | 30 sec | 230 | 174 |
| 500:1BOE @ 21°C | 1 m in | 370 | 268 |
| | 2 m in | 370 | 230 |
| | | | 670 |
| DI Water Contact Angle | 79.2 | 77.2 | 72 |
| Metrics | ER (A/m In) | ER (A/m In) | ER (A/m In) |
| 2.5% TMAH @ 21°C | 1 m in | -10 | -11 |
| | 2 m in | -9 | -7 |
| | 30 sec | 223 | 215 |
| 500:1BOE @ 21°C | 1 m in | 400 | 307 |
| | 2 m in | 405 | 313 |
| | | | [720] |
| DI Water Contact Angle | 77.5 | 78.3 | 70 |
| Metrics | ER (A/m In) | ER (A/m In) | ER (A/m In) |
| 2.5% TMAH @ 21°C | 1 m in | -4 | 1 |
| | 2 m in | -6 | -1 |
| | 30 sec | 266 | 256 |
| 500:1BOE @ 21°C | 1 m in | 326 | 274 |
| | 2 m in | [351] | [319] |
| | | | [722] |

Table 15

248 Abs. Comp 193 Absorbing composition

| Descriptions | | | + 600ppm TMAH |
|------------------------|-------------|-------------|------------------|
| Bake temp. (C) | 130/200C | | 130/240C |
| DI Water Contact Angle | | | |
| Metrics | ER (A/m In) | ER (A/m In) | ER (A/m In) |
| 2.5% TMAH @ 21°C | 1 min | 67 | -5 |
| | 2 min | 62 | -6 |
| | 30 sec | 815 | 219 |
| 500:1BOE @ 21°C | 1 min | 688 | 252 |
| | 2 min | 621 | 312 |
| NE-14 @ 21°C | 30 sec | 2833 | |
| | 1 min | > 2815 | |
| DI Water Contact Angle | | | |
| Metrics | ER (A/m In) | ER (A/m In) | ER (A/m In) |
| 2.5% TMAH @ 21°C | 1 min | 31 | -6 |
| | 2 min | 49 | -4 |
| | 30 sec | 753 | 195 |
| 500:1BOE @ 21°C | 1 min | 735 | 303 |
| | 2 min | [605.] | 320 |
| NE-14 @ 21°C | 30 sec | 2636 | |
| | 1 min | > 2710 | |
| DI Water Contact Angle | | | |
| Metrics | ER (A/m In) | ER (A/m In) | ER (A/m In) |
| 2.5% TMAH @ 21°C | 1 min | 74 | 2 |
| | 2 min | 80 | 1 |
| | 30 sec | 839 | 234 |
| 500:1BOE @ 21°C | 1 min | 742 | 282 |
| | 2 min | 655 | 315 |
| NE-14 @ 21°C | 30 sec | 3040 | |
| | 1 min | > 2792 | |

Table 16

248 Absorb. Comp. 193 Absorb. Composition

| Descriptions | | | + 600ppm Stabilized TMAA | + 600ppm TMAA |
|-----------------------|--------|------------|-----------------------------|------------------|
| Bake temp. (C) | | 130/200C | 130/240C | 130/240C |
| DIWater Contact Angle | | | | |
| Metrics | | ER (A/min) | ER (A/min) | ER (A/min) |
| 2.5% TMAH @ 21°C | 1 min | 53 | -2 | -1 |
| | 2 min | 56 | 1 | -6 |
| 500:1BOE @ 21°C | 30 sec | 700 | 173 | 184 |
| | 1 min | 688 | 156 | 253 |
| | 2 min | 601 | 168 | 286 |
| NE-14 @ 21°C | 30 sec | 1732 | | |
| | 1 min | > 2825 | | |

Table 17

248

AC

193 Absorbing Composition

| Description | | 248.2100.200m m | Rev | + 1070ppm "optimized" APTEOS Triflate | | | | | | | |
|----------------------|---------|--------------------|-----------|---------------------------------------|-----------|-----------|----------|-----------|----------|----------|--|
| pH | | N/A | A | 1.5 | <2 | | | | | | |
| Bake Sequence | | 130/200 C | 130/200°C | 90 sec | 130/180 C | 130/200°C | 130/220C | 130/240°C | 130/250C | 130/280C | |
| | | 50 sec | 90 sec | 90 sec | | | | | | | |
| 500:1 BOE | 1 min @ | ER | ER | ER | ER | ER | ER | ER | ER | ER | |
| | 20 °C | 743 | [1568] | [1403] | [1354] | 1311 | [1110] | 912 | 884 | [850] | |
| | 1 min @ | | | | | | | | | | |
| | 23 °C | 76 | 57 | 32 | 72 | 31 | 36 | 2 | 2 | 27 | |
| | 50 °C | 780 | 100 | 144 | 105 | 90 | 45 | 16 | 16 | 8 | |
| 2.3% aq. TMAH | 75 °C | 1931 | 781 | 797 | 622 | 446 | 372 | 228 | 179 | 129 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 5.0% aq. TMAH | 23 °C | | 43 | 37 | 81 | 1 | 21 | 16 | 20 | 0 | |
| | 50 °C | >3522 | 298 | 347 | 256 | 222 | 123 | 47 | 38 | 46 | |
| | 75 °C | >3556 | 1212 | 1261 | 789 | 782 | 624 | 406 | 321 | 211 | |
| 10.0% aq. TMAH | | | | | | | | | | | |
| | 23 °C | >3511 | 166 | 196 | 93 | 60 | 52 | 12 | 26 | 14 | |
| | 50 °C | >3536 | 716 | 766 | 704 | 485 | 294 | 205 | 115 | 41 | |
| TMAH | 75 °C | >3571 | >2706 | [1981] | [1493] | 1282 | 900 | 745 | 462 | 332 | |

Table 18

248 AC



193 Absorbing Composition

| Description | | 248.2100.200mm | | Rev A + 1070ppm "optimized" APTEOS Triflate + 1.5% DPG | | | | | |
|-------------|---------------|----------------|--------|--|----------|----------|----------|----------|----|
| pH | | N/A | | <2 | <2 | <2 | <2 | <2 | <2 |
| Bake | | 130/200 C | | 130/180 C | 130/200C | 130/220C | 130/240C | 130/260C | |
| Sequence | | 50 sec | | 90 sec | | | | | |
| 500:1 BOE | 1 min @ 20 °C | ER | ER | ER | ER | ER | ER | ER | ER |
| TMAH | 1 min @ 23 °C | [846] | [1603] | [1439] | [1282] | [1219] | [1143] | | |
| 2.5% aq. | 23 °C | 78 | 74 | 73 | 113 | 42 | 19 | | |
| TMAH | 50 °C | 393 | 386 | 146 | 123 | 10 | 23 | | |
| | 75 °C | 1988 | 2567 | 1483 | 1090 | 590 | 538 | | |
| 5.0% aq. | 23 °C | 818 | 110 | 54 | 27 | 73 | 42 | | |
| TMAH | 50 °C | > 3509 | 959 | 400 | 275 | 98 | 65 | | |
| | 75 °C | > 3484 | > 2862 | > 2867 | 1366 | 900 | 856 | | |
| 10.0% aq. | 23 °C | > 3486 | 503 | 105 | 75 | 31 | 23 | | |
| TMAH | 50 °C | > 3509 | 959 | 400 | 275 | 98 | 65 | | |
| | 75 °C | > 3474 | > 2804 | > 2819 | > 2821 | 1616 | 1283 | | |

248 AC

193 Absorbing Composition

[illegible]

Table 20

193 Absorb. Comp.

| Materials | pH | Days at 40C | Mn | Mw | Mp | Mz | M _{n+1} | PDI |
|---|-------|-------------|------|------|------|------|------------------|-------|
| Rev A + 1070 ppm "opt" apteos triflate | 1.732 | 0 | 780 | 1109 | 735 | 1488 | 1844 | 1.422 |
| | | 5 | 1062 | 1568 | 1329 | 2188 | 2853 | 1.476 |
| Rev A + 1070 ppm "opt" apteos triflate + 1.5% DPG | <2 | 0 | 891 | 1269 | 754 | 1722 | 2179 | 1.424 |
| | | 7 | 1058 | 1486 | 1198 | 1995 | 2520 | 1.404 |
| Rev A + 1070 ppm apteos msa + 1.5% DPG | <2 | 0 | 880 | 1241 | 749 | 1680 | 2127 | 1.41 |
| | | 7 | 1006 | 1410 | 1175 | 1887 | 2364 | 1.402 |

| | | | |
|---|------|------|-----------------|
| 5 days at 40C / 193AC | Mn | Mw | 110 nm via fill |
| pH 1.5 + 2000 ppm nitric acid acidified TMAA | 1289 | 1641 | No voiding |

Table 21

248
AC | 193 Absorbing Composition (AC)

| Description | 248.2100.200 mm | Rev A | pH 5.5 | Rev A + 1070ppm APTEOS Nitrate | Rev A + 1070ppm APTEOS Nitrate + 1.5% DPG | Rev A + 1070ppm APTEOS Nitrate + 3% DPG | Rev A + 1070ppm APTEOS Nitrate + 6% DPG | Rev A + 1070ppm APTEOS Nitrate + 9% DPG |
|-------------|-----------------|-----------|-----------|--------------------------------|---|---|---|---|
| pH | N/A | 1.5 | 5.5 | <2 | <2 | <2 | <2 | <2 |
| Bake | 130/200 C | 130/200°C | 130/240 C | 130/240 C | | | | |
| Sequence | 50 sec N2 | 90 sec N2 | 60 sec N2 | 90 sec N2 | | | | |
| 500:1 BOE | ER | | ER | ER | ER | ER | ER | ER |
| TMAH | 675 | [1568] | 612 | 422 | [545] | 571 | 681 | 626 |
| 2.5% aq. | 62 | Pre | | | | | | |
| 23°C | 2694 | 2694 | 41 | 28 | 1 | 30 | 56 | 32 |
| 50°C | 525 | 2663 | 41 | 42 | 0 | 28 | 20 | 26 |
| 75°C | 3018 | 2702 | 142 | 117 | 356 | 224 | 347 | 463 |
| 5.0% aq. | 485 | 2679 | 43 | 40 | 5 | 32 | 57 | 10 |
| TMAH | 3536 | 2723 | 9 | 20 | 18 | 17 | 21 | 13 |
| 23°C | 3527 | 2699 | 339 | 119 | 508 | 259 | 524 | 776 |
| 50°C | | | | | | | | |
| 75°C | | | | | | | | |
| 10.0% aq. | 3461 | 2687 | 17 | 33 | 2 | 20 | 36 | 14 |
| TMAH | 3469 | 2670 | 142 | 41 | 81 | 106 | 50 | 30 |
| 23°C | 3514 | 2706 | 859 | 219 | 1040 | 546 | 1075 | 1573 |
| 50°C | | | | | | | | |
| 75°C | | | | | | | | |

Figure 26

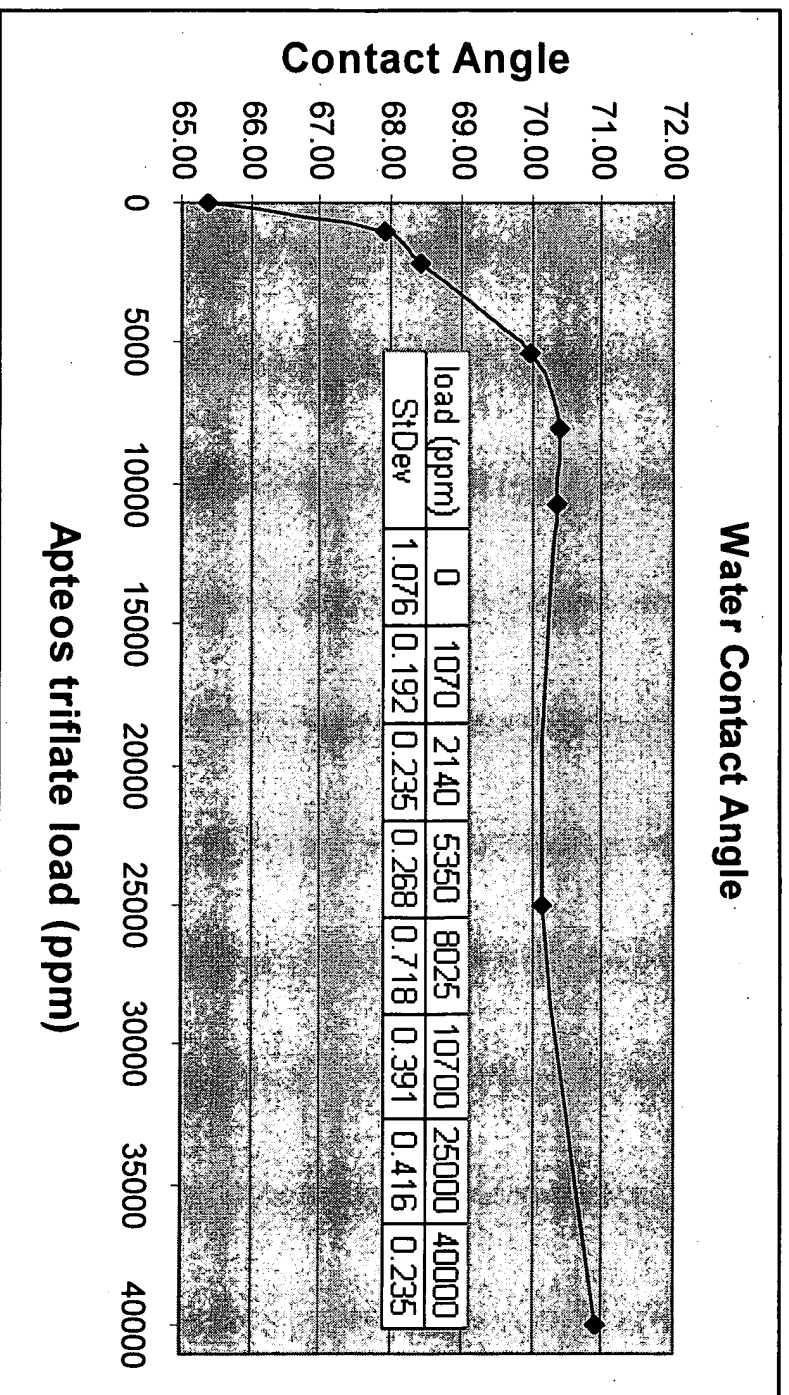


Table 12

193 Absorbing Comp.

| Description | Thickness | 1 dev | Reflectance @ 193nm | n @ 193nm | k @ 193nm |
|---------------------------------------|-----------|-------|------------------------|-----------|-----------|
| 193 Rev A | 1469 | 12.2 | 9.77 | 1.8027 | 0.3811 |
| 193 Rev A + 1070 ppm APTEOS Triflate | 1502 | 15.4 | 10.26 | 1.8019 | 0.3469 |
| 193 Rev A + 2140 ppm APTEOS Triflate | 1514 | 12.1 | 10.33 | 1.7945 | 0.3304 |
| 193 Rev A + 5350 ppm APTEOS Triflate | 1509 | 15.4 | 10.18 | 1.7931 | 0.3362 |
| 193 Rev A + 8025 ppm APTEOS Triflate | 1512 | 9.7 | 10.19 | 1.7918 | 0.3329 |
| 193 Rev A + 10700 ppm APTEOS Triflate | 1506 | 12.7 | 10.15 | 1.7958 | 0.3427 |
| 193 Rev A + 25000 ppm APTEOS Triflate | 1500 | 12.2 | 10.14 | 1.7998 | 0.3526 |
| 193 Rev A + 40000 ppm APTEOS Triflate | 1533 | 10.5 | 10.16 | 1.7793 | 0.3276 |

Table 23

| ppm APTEOS Triflate | 40C Aging | Mn | Mw | Mp | Mz | Mz+1 | Polydispersity |
|---------------------------------|-----------|------|------|------|------|------|----------------|
| 193 + 1070 ppm APTEOS Triflate | 0 | 920 | 1283 | 759 | 1724 | 2173 | 1.395362 |
| | 5 | 1279 | 1681 | 1405 | 2174 | 2706 | 1.314284 |
| 193 + 2140 ppm APTEOS Triflate | 0 | 754 | 1119 | 744 | 1562 | 2000 | 1.483957 |
| | 5 | 955 | 1378 | 788 | 1897 | 2455 | 1.442483 |
| 193 + 5350 ppm APTEOS Triflate | 0 | 876 | 1226 | 754 | 1640 | 2046 | 1.39940 |
| | 5 | 984 | 1367 | 779 | 1819 | 2268 | 1.38917 |
| 193 + 8025 ppm APTEOS Triflate | 0 | 877 | 1228 | 754 | 1646 | 2058 | 1.40051 |
| | 5 | 988 | 1369 | 1112 | 1812 | 2247 | 1.38518 |
| 193 + 10700 ppm APTEOS Triflate | 0 | 875 | 1226 | 755 | 1642 | 2052 | 1.40143 |
| | 5 | 1001 | 1396 | 1156 | 1860 | 2320 | 1.39492 |
| 193 + 25000 ppm APTEOS Triflate | 0 | 846 | 1204 | 764 | 1635 | 2060 | 1.42421 |
| | 5 | | | | | | |
| 193 + 40000 ppm APTEOS Triflate | 0 | 835 | 1169 | 755 | 1558 | 1930 | 1.39928 |
| | 5 | 846 | 1260 | 773 | 1726 | 2168 | 1.489298 |

193 Absorb. Comp.

Table 24

248 AC

193 Absorbing Composition

| Description | 248.2100.200mm | Rev A | Rev A + 10,700 ppm APTEOS Triflate (10X) | Rev A + 40,000 ppm APTEOS Triflate (37X) |
|--------------|----------------|-----------|---|---|
| pH | N/A | | < 2.5 | < 2.5 |
| Bake | 130/200 C | 130/200 C | 130/240 C | |
| Sequence | 50 sec N2 | 90 sec N2 | 90 sec N2 | |
| 500:1 | 1 min @ | ER | ER | ER |
| BOE | 20 °C | 751 | 776 | [1116] |
| TMAH | 1 min @ | | | |
| 2.5% aq. | 23 °C | 35 | 67 | 45 |
| | 50 °C | 493 | 100 | 95 |
| TMAH | 75 °C | 1488 | 781 | [2252] |
| 5.0% aq. | 23 °C | 287 | 43 | 6 |
| | 50 °C | [1604] | 298 | 809 |
| TMAH | 75 °C | [2639] | 1212 | 2709 |
| 10.0% aq. | 23 °C | > 3491 | 166 | 17 |
| | 50 °C | > 3427 | 716 | 878 |
| TMAH | 75 °C | > 3443 | > 2706 | > 2912 |

Figure 27

